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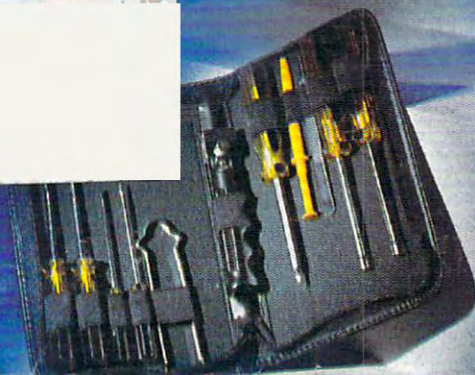
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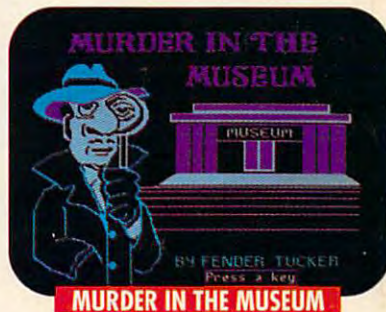
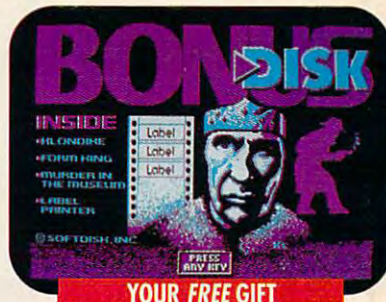
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Computer Gaming World
August 1991



"With its associated software, it has quietly (no pun intended, but what the heck) become the standard sound system for advanced PCs."
Jerry Pournelle, **BYTE** June 1991



COMPUTE August 1991

"...Creative Labs is now turning up the volume with the Sound Blaster Pro. It's basically two Sound Blasters on a single card with additional multimedia features thrown in. It has twin FM chips capable of creating 22 individual voices, two DACs for stereo voice and sound-effects playback, a stereo microphone jack, and a built-in stereo mixer that can adjust the volume of all your Sound Blaster audio sources (stereo DAC, stereo FM, microphone, stereo line-in, CD-Audio and PC internal speaker).

The built-in mixer makes the Sound Blaster Pro fully compliant with Microsoft's Multimedia Level 1 Extensions to Windows. Multimedia software will be able to fade-in, fade-out and pan the various audio sources to create elaborate sound montages.

The Sound Blaster Pro includes a CD-ROM interface for either an internal or external CD-ROM player. There's also an internal connector for CD-Audio. The MIDI interface is compatible with the original Sound Blaster's MIDI interface but adds the MIDI time-stamp that's part of Microsoft's new multimedia standard.

All in all, the Sound Blaster Pro is chock-full of new features, yet it's fully compatible with its younger brother."

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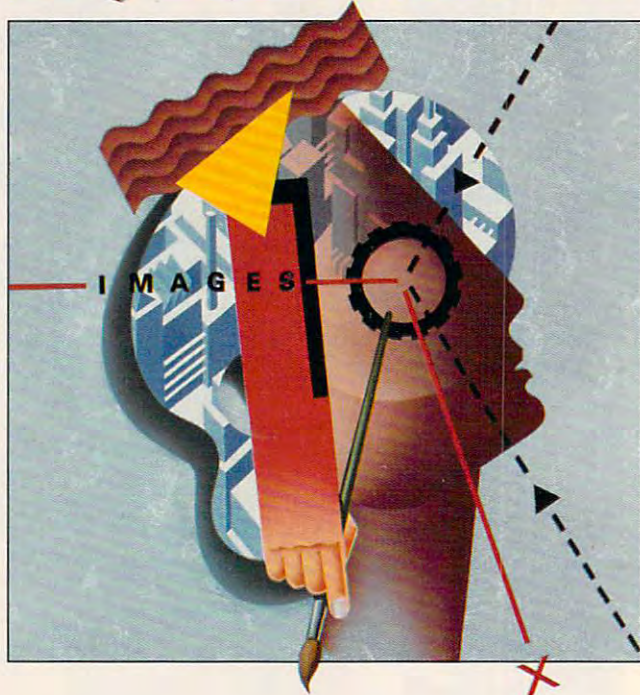
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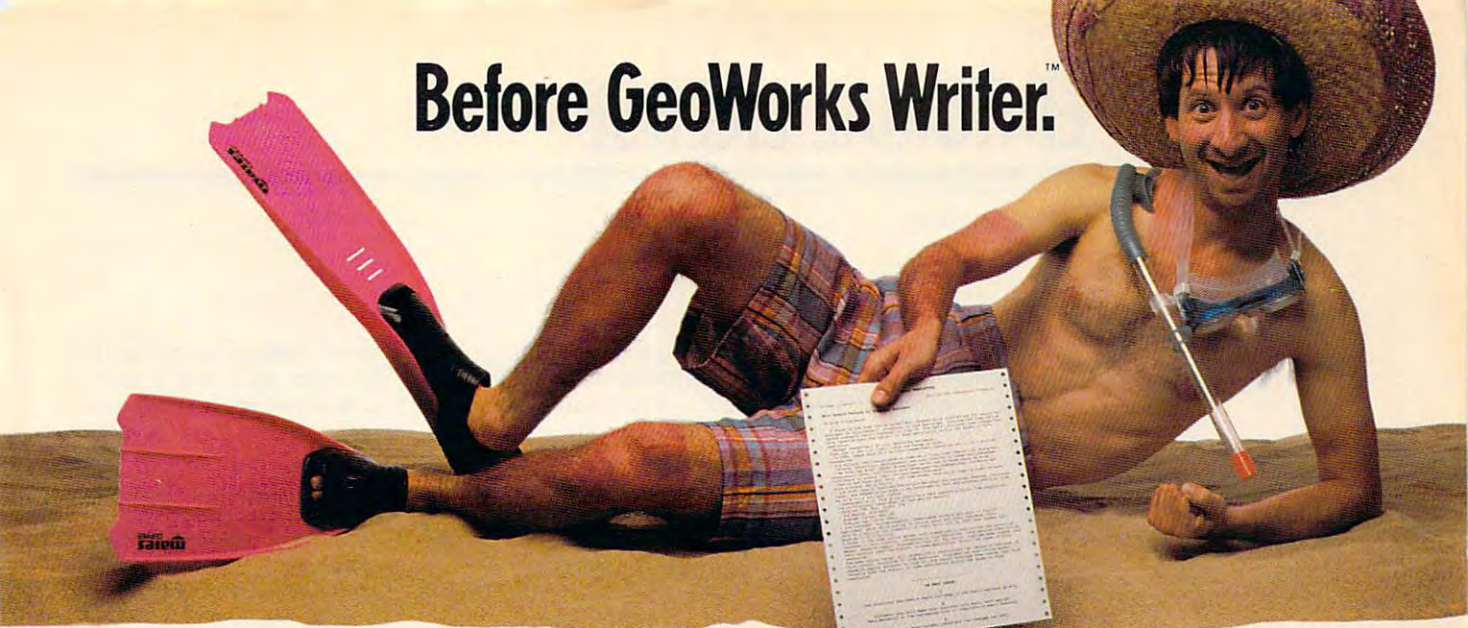
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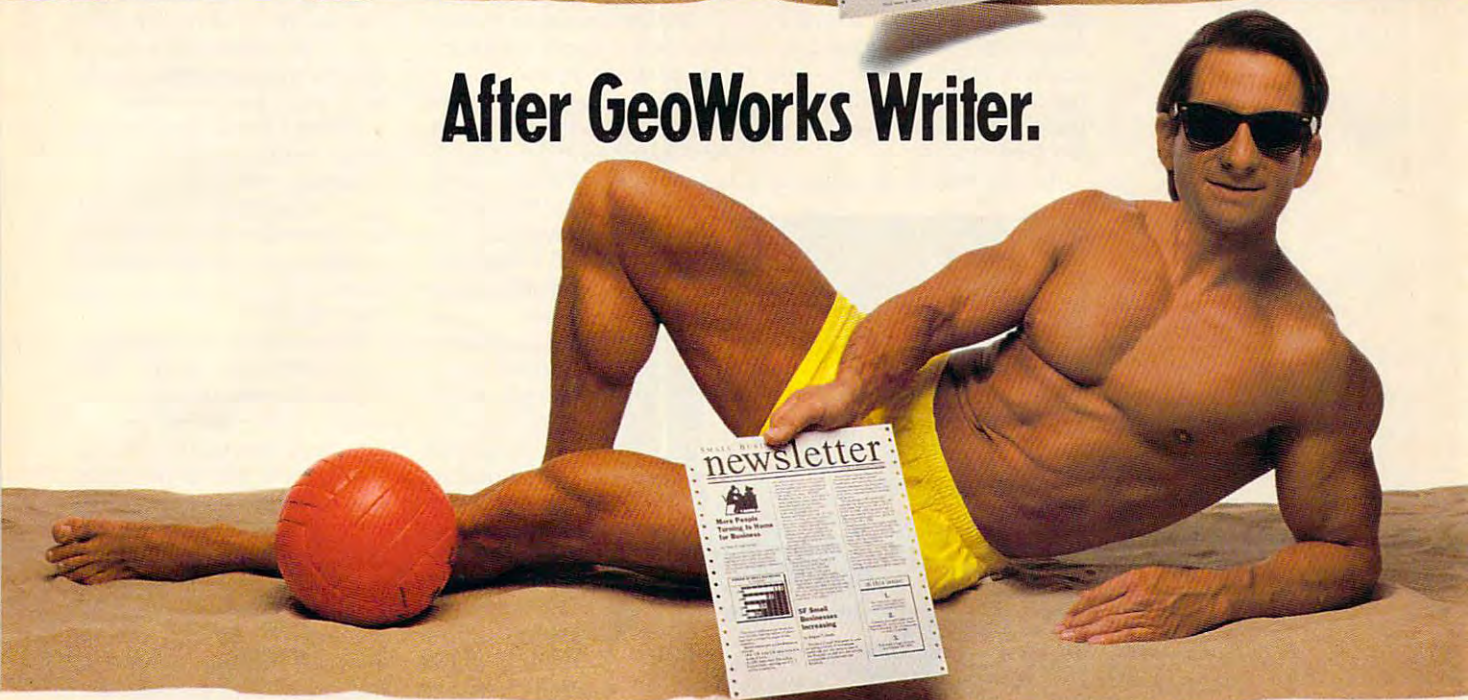
SPECIAL SECTION

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COMPUTE's Getting Started with™
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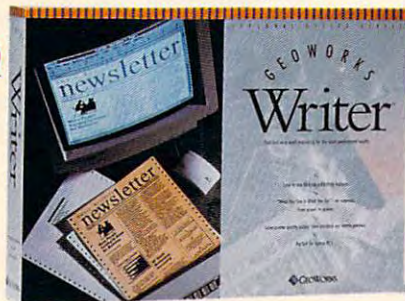
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Clifton Karnes

In the not-too-distant future, computers will replace books and magazines. That's a statement I've heard dozens of times in the last ten years, but since the advent of multimedia, I've heard it more often.

At COMPUTE, computers and paper are both important, and we're committed to both technologies. We believe in the power of the personal computer to enrich our lives, and our magazine is distributed on paper, the medium we feel is the best choice.

To understand the comput-

ers unquestionably have the power to replace paper documents in the workplace, they have not done so. In fact, PCs have enabled us to produce more paper, and we have.

The initial shot of the second computer revolution was fired when the first BBS went online. In a few years, personal computers became communications devices. Networking, whether in the form of local area networks (LANs) or commercial online services, soon reached more than 70 percent of the PC community.

In this second revolution, the PC's main competitor was another paper-based system: mail. Although the PC may have reduced paper-based mail for some businesses, personal computers, again, are actually creating *more* paper mail. If you've been going to the mailbox for the last ten years, compare the amount of junk mail you receive now with what you were getting in 1981.

In 1991, we've waged the first battles of computing's third, and most dramatic, revolution: multimedia. Although multimedia PCs may look like their predecessors, multimedia machines are radically different from previous computers, in that they're bona fide delivery systems for information. Because of this, they're more like paper. Will these newest PCs replace paper where their ancestors have

failed? Before we tackle that question, let's take a look at what paper has to offer as an information delivery system.

First, paper has tremendous information density. A page of paper can hold about 33 times as much information as a Super VGA screen. For example, an 800 x 600 VGA display sports a resolution of about 75 lines per inch, while an average book or magazine comes closer to 2500 lines per inch.

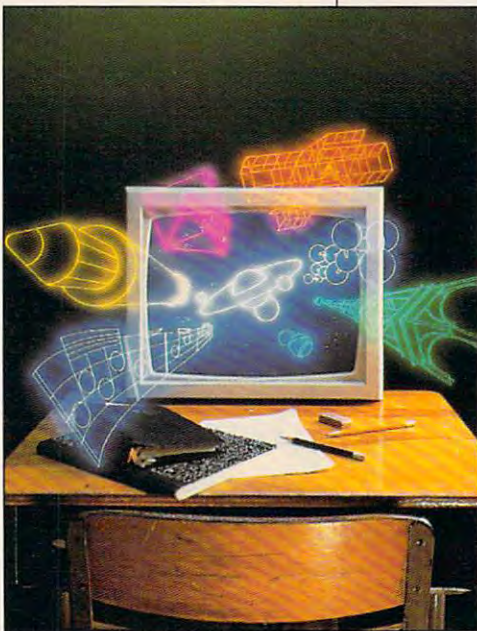
When it comes to cost, paper is hard to beat. Go to any drugstore, and you can pick up a small pack of the stuff for under \$1. Computers, by comparison, are expensive. A top-notch 386 will set you back \$3,000.

Paper's third important quality is portability. While paper is light and easy to move, computers are cumbersome. If you own a notebook PC, try reading it in bed or on a bus, and you'll agree that a book or magazine is a much more graceful traveling companion.

Paper's last outstanding quality is the relative ease with which you can scan it. Flipping through a book or magazine lets your eyes dart from page to page. This type of top-down, random access is nearly impossible on a PC.

Does all this mean that the PC is in some way a failure? Not at all. It's unquestionably the empowering tool of the century, and it ranks with the invention of the wheel in importance. Its strengths have always been the powerful ways it can transform and combine information. What this does mean, however, is that paper will continue to be a partner, rather than a casualty, of the computer revolution. But if paper isn't in the computer's line of sight, is something else? Yes. And the endangered species is sitting right in your living room: TV. □

In the last ten years, the PC has instigated no less than three revolutions, and in each, it has gone head-to-head with paper.



er-versus-paper question, it's necessary to look at the PC's history. In the last ten years, the PC has instigated no less than three revolutions, and in each, it has gone head-to-head with paper.

The first revolution was sparked by the birth of the personal computer itself. These early machines were limited in power, but their potential was obvious. Before the revolution was more than a few years old, we heard the cry of the paperless office. Although

ceive now with what you were getting in 1981.

In 1991, we've waged the first battles of computing's third, and most dramatic, revolution: multimedia. Although multimedia PCs may look like their predecessors, multimedia machines are radically different from previous computers, in that they're bona fide delivery systems for information. Because of this, they're more like paper. Will these newest PCs replace paper where their ancestors have

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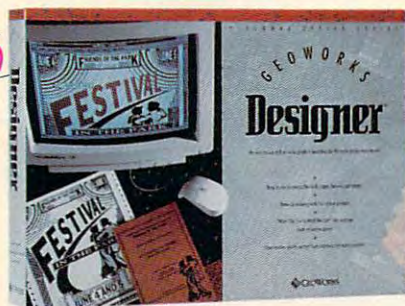
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ALAN BECHTOLD

Stop, Look, Listen

If multimedia has been mostly smoke and mirrors so far, two new multimedia boards from ATI may help clear the air. The AUDIO FX provides high-quality stereo sound recording and playback with sampling rates as high as 44 kHz and built-in filters to help reduce noise and distortion. It's fully compatible with Ad Lib and Sound Blaster sound boards and Microsoft's new multimedia specifications.

VGAUDIO FX includes the audio capabilities of the AUDIO FX, as well as the graphics features of ATI's innovative VGAWONDER XL board, including high-resolution 15-bit color (for 32,768 simultaneous colors) and fast video-graphics processing. The VGAUDIO FX also includes a built-in mouse port, a 400-dpi mouse, and extensive driver support.

The AUDIO FX and the VGAUDIO FX boards should be available by the time you read this for \$199 and \$499 respectively. For more information, contact ATI Technologies, 3761 Victoria Park Avenue, Scarborough, Ontario, Canada M1W 3S2; (416) 756-0718.

DAVID ENGLISH

Computing on the Far Side

Far Side fans take note: Gary Larson's bizarre world is now a computer calendar, complete with all the bugs, mammals, amoebas, nerds, and nagging spouses that have made Larson one of America's favorite cartoonists.

The Far Side Computer Calendar is a personal appointment calendar that includes a year's collection of Larson's funniest, most artful truisms from the 1992 desktop calendar. Along with the cartoon-a-day humor, the program is bound to induce plenty of sporadic laughter when Larson's eccentric characters make random appearances on the com-

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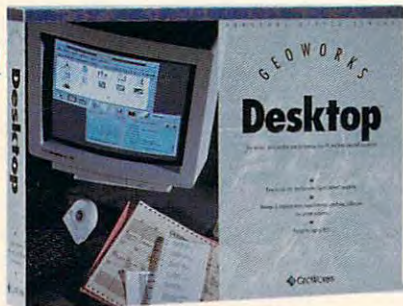
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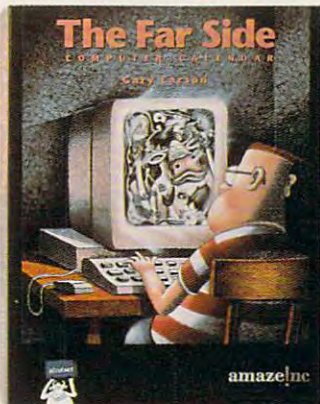
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puter screen during the day. A flock of penguins float across the screen on an ice floe when you least expect it; meteorites crash through your appointment schedule just when you're in danger of taking yourself too seriously. Of course, this surprise element of the program can be turned off at any time if you'd rather do without the interruptions.

In addition to entertainment, *The Far Side Computer Calendar* provides a very useful day organizer that offers day-, week-, month-, and year-at-a-glance modes, each of which can be edited and printed out in different sizes. You can program in recurring events for weekly, biweekly, and monthly schedules and set sound alarms to remind

Far Side fans can get a daily dose of Gary Larson's off-the-wall hug, cow, and nerd humor with *The Far Side Computer Calendar*.



yourself of upcoming tasks and events. Every calendar function is accessed through its own animated icon.

Once the current calendar year expires, graphical refills for the cartoon-a-day feature are available for another year of *Far Side* humor. Complete versions of *The Far Side Computer Calendar* are available in DOS, Microsoft Windows, and Macintosh versions. Suggested retail price is \$69.95.

For more information, contact Amaze!nc, 11810 115th Avenue NE, Kirkland, Washington 98034; (206) 820-7007.

DANA STOLL

Braille in Your Pocket

The visually impaired will benefit from the pocket computer revolution if TeleSensory Systems has anything to do with it. The company's new BrailleMate PC is a one-pound computer, small enough to fit in a coat pocket, that can be used for note taking; compiling names, addresses, and phone numbers; and communicating with other computers. It also has a calculator and a clock/calendar.

Instead of a slate-and-stylus method, BrailleMate's Braille keyboard enables rapid writing into a solid-state memory using a built-in editor. It acknowledges what has been written into its memory with a speech synthesizer and an electronically operated Braille cell.

By combining both Braille and speech outputs, the accuracy of Braille and the speed of speech are achieved. The computer stores up to 128 Braille pages in its internal memory, and credit card-sized memory cards can be slipped into the bottom for extended memory.

In addition to helping visually impaired persons, BrailleMate can also be used to help students learn Braille. The computer's synthetic speech can be used to instruct a student verbally, while the Braille cell and Braille keyboard allow drill and practice exercises. BrailleMate also has serial and parallel ports for connecting to printers, PCs, and modems. Suggested price is \$1,595.

For more information on BrailleMate, contact TeleSensory Systems, 455 North Bernardo Avenue, P.O. Box 7455, Mountain View, California 94043; (415) 960-0920.

ALAN BECHTOLD

Human Computers

Cars that see and avoid accidents, ear implants that allow the deaf to hear—those are

just two of the countless possibilities that could emerge from the work of scientists studying the human brain at the Los Alamos National Laboratory in New Mexico.

Bryan Travis and other scientists from the Laboratory's Earth and Environment Sciences Division are using computer programs that mimic human vision and hearing to understand how the brain works. Travis, Susan Coghlan of the Los Alamos Center for Non-linear Studies, and graduate student Maureen Gremillion have developed a computer-based brain function simulator, called a NeuroBuilder, to model a variety of brain functions.

Since the brain assimilates most information through the senses, creating a computer model of the visual and auditory processes is the first step toward developing more complicated models to study how the human brain assimilates, encodes, and disseminates information.

Using the NeuroBuilder, scientists can put together their own models of multilevel neurobiological brain networks, experimenting with different neuron connections to see what the results would be in a human brain.

According to spokesperson Catherine Baldwin, once they are perfected, the models might be used to create seeing and hearing computer chips that use processing similar to the brain's. Computer chips as implants would be able to send impulses through the human nervous system, mimicking brain circuitry—still unknown territory.

What is known is that the brain manages massive amounts of information simultaneously. Hopefully, the NeuroBuilder will help scientists unravel the brain's mysteries. That's the goal, Baldwin says.

JILL CHAMPION

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No Hard Format

Several years ago I picked up a little program that restricted the FORMAT command so that it would apply only to drives A and B. An entirely separate command was used to format the hard disk. I used it very successfully until my hard disk crashed. Then, when I looked for the program, either someone had borrowed it or it was thrown out during housecleaning in the computer room.

S. L. MOOTHART
FLORISSANT, MO

As somebody once said, lost programs, like lost socks, are an unavoidable result of keeping things tidy. If you wash your socks, you inevitably lose one. If you clean your computer room, you'll always lose the one irreplaceable piece of software you can't live without. The moral: Never clean your computer room or your socks.

Newer versions of DOS always pause to ask for confirmation before formatting a disk, but if that isn't enough protection, here's a trick that has preserved the contents of many a hard disk. Change to the directory that contains FORMAT.EXE, the program that does the formatting. At the command line, type

REN FORMAT.EXE DOORMAT.EXE

Then hit Enter. Next, we'll write a batch file that checks to make sure you haven't specified a hard disk. At the command line, type

COPY CON FORMAT.BAT

Then enter the following lines:

```
ECHO OFF
IF (%1)==( ) GOTO DROP
IF %1==C GOTO DROP
IF %1==c GOTO DROP
```

```
REM REMEMBER TO COPY ABOVE
LINES,
REM REMOVING C: AND REPLAC-
ING IT WITH
REM REMAINING HARD DISK DES-
IGNATIONS
:DOIT DOORMAT %1
:DROP
```

When you're finished, save the file by pressing F6 and Enter. Now, when you want to format a disk, if there's no argument after the FORMAT command, the program won't run. The same thing happens if you attempt to format any of your hard disks (assuming that you followed the instructions in the REM statements). However, you can still format your C drive by entering the command DOORMAT C: or entering DOORMAT while logged to the C drive.

Stashgraph

Is it possible to save a portion of a graphics screen to memory within a BASIC program? Please keep in mind that I don't have QuickBASIC. Also, is there a difference between a 386SX-20 and a 386-20?

PATRICK YANER
GENESE, BELGIUM

You need to use the BASIC command GET to place some part of the graphics screen in RAM and the command PUT to copy that clipping back to the screen. These commands are very complicated to use, and most manuals present these commands in a confusing way. Although you use an array variable to store the data, you type it in the GET and PUT statements as if it were a normal one-dimensional floating-point variable. Here's an example in GW-BASIC:

```
10 DIM A(100)
20 SCREEN 2:CLS:
PRINT"COMPUTE"
30 GET (0,0)-(56,8),A
```

```
40 FOR I = 0 TO 639 STEP 80
50 PUT (I,50),A
60 NEXT
```

Turning to your second question, the difference between a 386 and a 386SX is that a 386SX chip can only address memory and the expansion bus 16 bits at a time. A true 386 (also known as a 386DX or an i386DX) can address both memory and the expansion bus 32 bits at a time. This doubles the speed of some operations.

Catch the Red-Eye to Mars

I read Steven Anzovin's "Pathways" column about using your PC as a ticket to Mars in the May issue of COMPUTE. I liked the idea of creating fractal landscapes from the United States Geologic Survey's Digital Elevation Mapping files. But I don't own an Amiga. I have an IBM compatible (286 with VGA). I was wondering if you could give me the names and prices of any software titles that are similar to Vista but made to run on the IBM.

CHRIS HILL
INDIANAPOLIS, IN

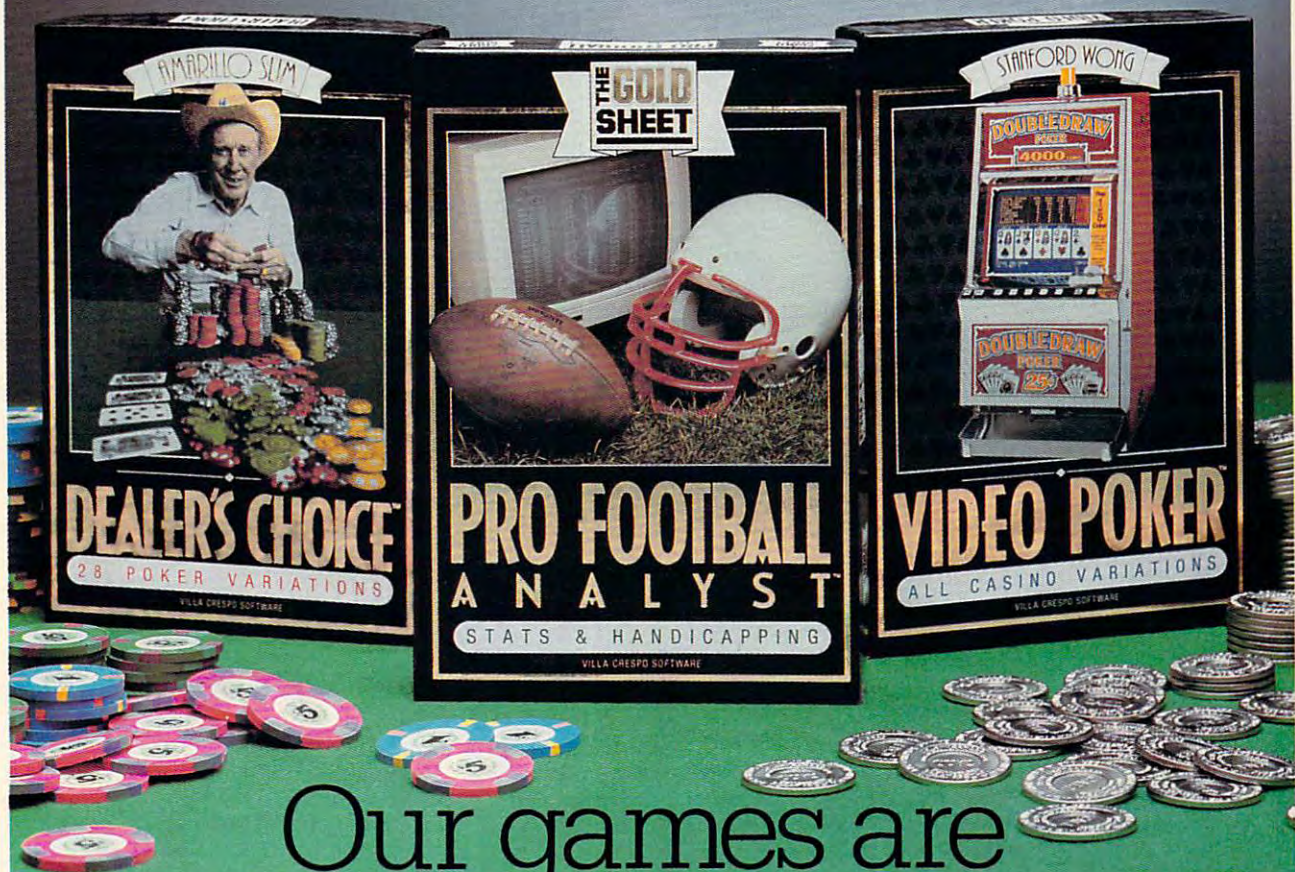
Virtual Reality (VRI), publishers of Vista, should have introduced a PC version by the time this letter appears. VRI is located at 2341 Ganador Court, San Luis Obispo, California 93401; (805) 545-8515.

Not So Sweet 16

My friend and I are currently writing a drawing program in the Tandy version of GW-BASIC. We're using 16 colors at 320 x 200 resolution and are interested in converting it over into QuickBASIC version 4.0, but it doesn't seem to be able to support Tandy 16-color graphics. We were wondering if there was any way we could do this, and if so, how?

MARK MATINGLY
PRYOR, OK

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Microsoft doesn't support Tandy 16-color graphics in its current version of QuickBASIC and has no plans to support it in the future. True BASIC doesn't support it, and neither does PowerBASIC.

The programming staff here at COMPUTE believes that the 16-color BASIC support would be easy enough to create with machine language routines if you're interested in exploring that approach to the problem. Borland has said that its libraries can be edited to allow you to program for the Tandy video adapter in C and Pascal, but Borland no longer supports a BASIC. PowerBASIC used to be a Borland product (Turbo Basic), so you might investigate whether its graphics-adaptor libraries can be rewritten in a similar way.

Ware to Share

I've written a couple of games on my Tandy computer, but when it comes to marketing, I'm lost. A friend suggested shareware, but I don't know how to go about distributing my programs as shareware. Can you help?

JAMES F. LONG
FARMVILLE, NC

The way to market a program as shareware is to place an opening screen on your program informing the user that it's shareware and that if the user likes the game, the registration fee is some amount of money (usually between \$10 and \$20).

It's a good strategy to offer a premium for registering, such as a version of the product in color, a special set of background screens, or an additional game. Make sure your name and address are clearly visible. Some authors put a routine in their programs that automatically prints out a registration form if

a certain key is pressed. You'll want to make your product as professional as you can, perhaps even providing a manual and a backup copy to people who register.

Finally, you'll need to upload the program to various online services, like CompuServe, GEnie, Delphi, PC Link, and any others you can think of. Get a list of bulletin boards in your area and upload it to them as well. You might be surprised at how quickly you start receiving registrations, depending on how useful or fun your program is.

PC Emulation

Is there an emulation program that allows an IBM PC to run programs written for other computers?

MICHAEL HORN
SWEENEY, TX

While they were once the game programmer's darlings, the Commodore 8-bit computers are starting to disappear from lists of equipment supported by software companies. Most new games are actually introduced for the PC and then translated for other machines. The PC is such a basic box that it would require a massive hardware investment even to make it emulate a Commodore 64. While you can find equipment and programs that enable the Amiga, Atari ST, and Macintosh to run PC software, it's unlikely that PC equipment will emerge to emulate these other machines. Enthusiasts for these machines will tell you that it's easier to make a race-car act like a tin lizzie than the other way around.

A coprocessor board is available to make a PC operate like an Apple IIe. It's sold with an Apple II-compatible disk drive, and it can access the PC's hard drive. It costs \$445. To find out the name of

a dealer in your area, call (408) 736-2000 or write to Diamond Computer Systems, 532 Mercury Drive, Sunnyvale, California 94086.

UniForm-PC (\$69.95) lets your PC read CP/M disks, copy CP/M files to MS-DOS, or copy MS-DOS files to CP/M. UniForm-PC can read and write over 300 CP/M formats. Since it doesn't cover all CP/M formats, you should call the company to make sure it can be of use to you.

MicroSolutions also offers UniDOS (\$69.95), which creates a Z80 CP/M version 2.2-compatible environment that can run CP/M programs on your PC. UniDOS is also available with a Z80 card (8 MHz, \$175 for both) that, according to the manufacturer, can make your CP/M programs run "twice as fast as they ever would on most CP/M computers." For more information, write to MicroSolutions at 132 West Lincoln Highway, DeKalb, Illinois 60115, or call (815) 756-3411.

The Amiga is your best choice for emulation, since programs and hardware are available that allow it to emulate a Macintosh, a PC, and a Commodore 64.

Blazing Pascals

I am a programmer in Turbo Pascal 5.0. The command KEEP (exitcode); will make the program terminate and stay resident (TSR). I would like to know how to make the program come back after this command when a certain hot key is pressed. Also, what is an interrupt vector?

ADAM BAUER
BROOKLYN, NY

According to our programming staff, the answer to your first question is dauntingly complex. Fortunately, many people have had to come up with it in the past, so there is



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FEEDBACK

prewritten code available to allow you to recall TSR programs and perform lots of other tricks. Where will you find this information? In the libraries of Code Runner from Microsystems Software or the shareware package Tesseract, which can be found on GENie and CompuServe. Moving on to your second question, an interrupt vector is an address to which the interrupt jumps to complete its work. These addresses are located in the first K of RAM, and they are very easily located. Since each interrupt requires a four-byte address, you simply multiply the interrupt number by 4 to locate the vector address. Interrupt 0's address is at location 0000h. Interrupt 21's address is at location \$0054 (decimal 84, which is 4*21).

Mea Gulpa

Whoops! On page 20 of the July issue of COMPUTE, you inadvertently used a screen shot of DINE Windows 3.0, a full-featured nutrient analysis, diet-improvement software product, to illustrate a review of another product. DINE Systems wishes to thank those readers who called us to point out the error. Although you graciously agreed to publish this letter in "Feedback," I believe that a more appropriate rectification would be to publish an insert with the screen shot and text describing our DINE Windows 3.0 product.

DARWIN DENNISON, PRESIDENT
DINE SYSTEMS
AMHERST, NY

COMPUTE regrets the error.

Oracular Access

DELPHI was inadvertently left off of a list of telecommunications services in the November COMPUTE, in the World of Electronic Games section. DELPHI offers two basic plans. The first charges \$6.00

per month for nonprime-time access, with a \$5.95 minimum, for which you receive one free hour of access. The other is called the 20/20 plan, which provides 20 hours of nonprime-time service for \$20 per month, and only \$1.25 per hour for each nonprime-time hour after the first 20. The 20/20 service is only available if you have access to Tymnet. The initial sign-up charge is \$39.00. DELPHI can be reached at (800) 544-4005 or by writing to DELPHI, General Videotex, 1030 Massachusetts Avenue, Cambridge, Massachusetts 02138. COMPUTE would like to apologize for this oversight.

Virus Guide

One powerful antivirus program was accidentally left out of our October "Buyer's Guide to Virus Protection Software." The Norton Antivirus program (\$129) is a heavy hitter. It offers constant memory-resident protection, automatic scanning that checks for viruses every time a file is opened, and instant updates on the latest viruses via Symantec's 24-hour Virus Newslines. We apologize for its omission. You may contact Symantec at 10201 Torre Avenue, Cupertino, California 95014-2132 or call (800) 441-7234.

Readers whose letters appear in "Feedback" will receive a free COMPUTE's PC clock radio while supplies last. Do you have a question about hardware or software? Or have you discovered something that could help other PC users? If so, we want to hear from you. Write to COMPUTE's Feedback, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. We regret that we cannot provide personal replies to technical questions. □

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Richard C. Leinecker

MERRY SHAREPAK

Christmas is fast approaching, and here's a great gift idea: COMPUTE's *SharePak* disk. December's *SharePak* is filled with three stocking stuffer programs sure to please every computer user on your Christmas list.

EZ-MENU puts a friendly menu system between you and the DOS prompt. It's the perfect answer for anyone who would rather not fool with com-

the online services for shareware so you don't have to.

Our connect time each month totals more than 100 hours, which would add up to a chunk of change if you searched yourself. By running and evaluating the programs, we also save you a lot of time. Considering *SharePak*'s low cost, you're getting real value.

EZ-MENU

You've read the manuals: "At the DOS prompt, type C:\THIS\THAT\AND THE OTHER." Forget your exasperation; now you have *EZ-MENU* to give DOS a facelift and run programs with one keypress.

EZ-MENU sets up in just a few minutes. It goes through your hard drive, making a list of all your applications and organizing them by type (for example, grouping all paint programs together), and then makes a menu for you. The result is a neatly organized, time-saving DOS menu.

EZ-MENU's documentation is short, but its online help is long; you can skip reading most of the manual and rely on the program for help.

To run *EZ-MENU*, you'll need a hard drive and 256K of available memory. The program works with any monitor.

PuzzleMaster 2.7

I love games like the ones in this brain-teasing collection. Instead of arcade shoot-'em-ups, *PuzzleMaster* gives you six mind-challenging diversions. One game is similar to *MasterMind*; one's a lot like *Simon*. There's also a word jumble game, a peg game, a slide puzzle game, and a jigsaw puzzle. Don't expect to get bored anytime soon.

Not only do you have a variety of games to choose from, but you can set difficulty levels and several game options. Your slide puzzle can be 3 x 3, 4 x 4, 5 x 5, or 6 x 6. I

still can't solve the 6 x 6 puzzle. The game called *CopyCat* that's similar to *Simon* will always get the best of you.

Computers are like elephants; they don't forget. So even if you have the best memory, you'll eventually miss one of the notes in the pattern as you try to replay what you've just heard in *CopyCat*. Luckily, for all the puzzles, you can save all the games and try them again later.

To play *PuzzleMaster* you need 256K of available memory. Although the program will run in monochrome, a color monitor is recommended.

PCBENCH

For all the techies and other interested parties on your list, *PCBENCH* will help separate the wheat from the chaff—the silicon computers from the Jell-O. Just install the program and tell it to start, and you'll get a complete report of your system's performance.

You'll find the resulting figures quite meaningful. You'll get average seek times for your hard drive and other similarly technical stats. If you're not up to the technical stats, though, you can see a comparison to several levels of industry-standard computers. IBM XTs, PS/2s, and ATs are among those that will be compared to your system. I loved seeing that my system performed 27 times better than the original IBM XT!

If you're looking for a used computer, this program really comes in handy. You can run it and get the *real* story on any computer you're interested in and plough through any bogus claims a seller might be tempted to make. If you're looking for a new system, just convince the salesperson to let you run *PCBENCH* on a showroom model.

PCBENCH runs on any system with 256K of memory. □

December's
**SharePak: three
great stocking
stuffers sure to
please every
computer user on
your list.**



EZ-MENU turns DOS into a whole different ball game.



Sharpen your mind skills with *PuzzleMaster*'s six games.

mands at the DOS prompt, and it's especially useful for those new to DOS. *PuzzleMaster* will keep the entire family entertained for hours on those snowy days. *PCBENCH* is for all the techies on your list who'd like to explore and compare different computer systems.

What is *SharePak*? It's an assortment of shareware we've methodically collected and carefully screened and put together on a single disk for your enjoyment. We search

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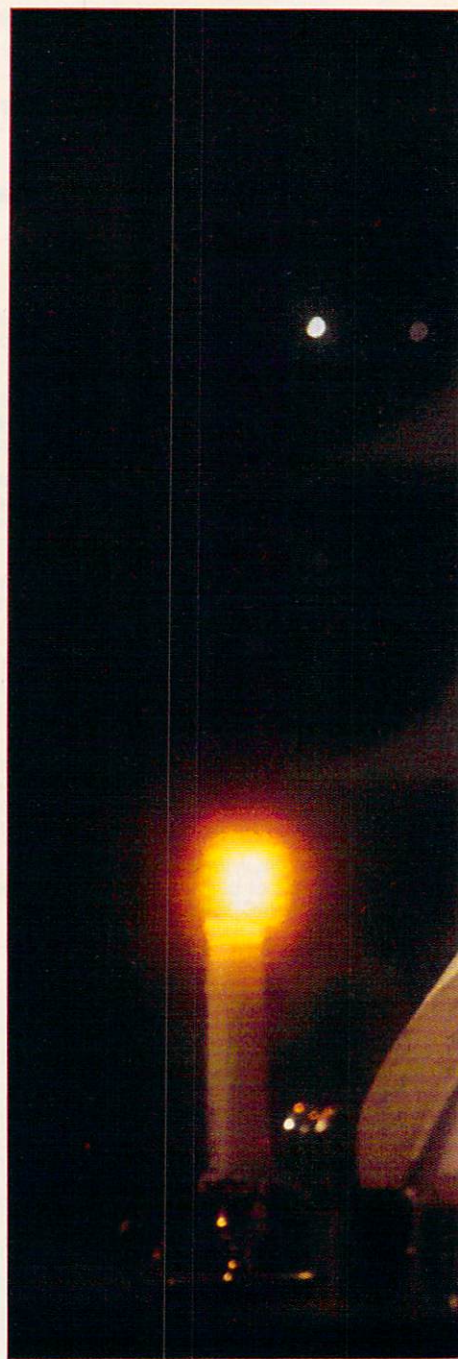
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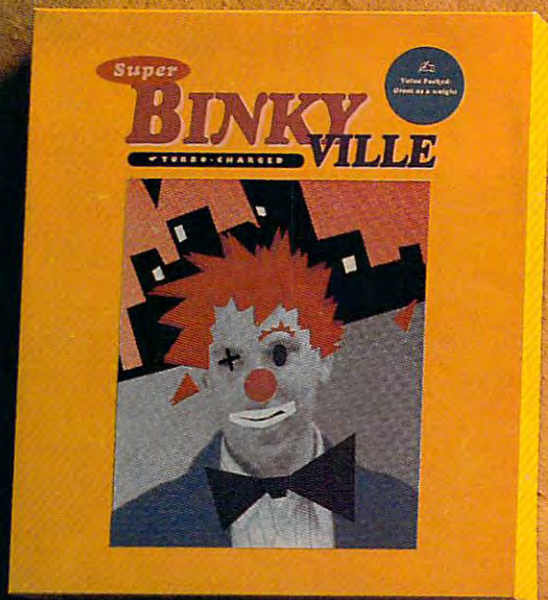
Christmas Wish Lists

'Twas the night before Christmas,
and all through *COMPUTE*,
The staff was a-scurrying to not get the boot.
The pages were sent to the printer
with care, In hopes that St. Silicon soon
would be there. The editors' thoughts
turned to spending with glee. With money no
object, what would they find
under the tree? Their wishes all vary,
but one thing's for sure,
The delusions they're having are full of grandeur.
Gather 'round close as the
editors themselves Tell what they dream of
having on their desks and their shelves.

BY ERIN RICHTER







Which Would You Rather Have? A Game That Challenges You For A Few Weeks.

Jill Champion Assistant Editor

Dear old St. Nick, I've been dreaming all year of a chance to get away from it all, and you're the only one who can make that happen. I'd like my own personal version of Sega's holographic videogame machine with all the bells and whistles that make it come alive—the 12-inch laser disc player and the 20-inch monitor with digital stereo sound and full digital graphics. I don't want a 3-D effect—I want 3-D for real.

Oh, and I'd like my own adventures for that holographic virtual world. *Hologram Time Traveler's* a little on the violent side for me, although I wouldn't mind catching a ripple or two. Just be sure to fill my holographic video machine with fantasy, thrills, and even a little mischief. Having my own game will allow me to jump in and play any old time without fighting all the teens at the local video arcade down at the mall. I know if you and your elves put your heads together, you'll find a way to leave that Sega machine under my Christmas tree. It's pricey; that's true. But please, Santa, it's the only thing I want.

Mike Hudnall Reviews Editor

Pay attention, Santa. My old 8088 has served me well, but under my Christmas tree, I'd like to see a brand-new computer system with more speed, storage, and power—the ZEOS 386-33C, a 33-MHz vertical system with a 128K processor cache.

You've seen my crowded desktop, so you know how I need the vertical cabinet. I won't be greedy and ask for the 200MB drive; the 130MB drive will suffice (for the present), fast and spacious enough to handle any review software I might bring home. I'd like 8MB of memory rather than the standard 4MB, since this will have to last me for quite a while, and I'll be running some memory-intensive programs. The 1.2MB floppy drive and 1.44MB floppy drive should enable me to handle my extensive collection of old 360K floppies as well as any new software that comes along. With a 300-watt power supply and a total of eight expansion slots and eight bays, I'll have plenty of room for my modem, my fax board, my Sound Blaster, and any hardware goodies that may come my way for review. And Santa, give my eyes a

break, please, with a color VGA monitor, so that I can enjoy all those great games I'll be getting for Christmas to the maximum.

I'd also like *The Oxford English Dictionary* (better known as the *OED*) to use as a reference tool. I joined a book club for the sole purpose of getting the microprint *OED*, but I can throw away my magnifying glass because now it's out on

CD-ROM. This dictionary makes for fascinating reading.



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David English Managing Editor

If money were no object—though it almost always is—I would have to select one of the new color LCD portable computers. The Toshiba T3200SXC features a 20-MHz 386SX processor, a sharp-as-a-tack VGA color LCD screen, a 120MB hard drive, and two slots for IBM-compatible expansion cards. It's only \$7,249.

If altruism truly has no bounds, I would like Dolch's lightning-fast color portable—the PAC 486-33E. It has a 33-MHz 486 processor, a Super VGA color LCD screen, a 420MB hard drive, and four EISA expansion slots. In the neighborhood of \$14,000. Nice neighborhood.

Most of my friends are mere mortals who have to watch every dollar, so I'll just ask for Central Point Soft-



ware's *PC Tools* 7.1 or Microsoft's MS-DOS 5.0. Every computer should have both, and if you know someone who has an earlier version of either, now would be a great time to buy the upgrade.

Who am I kidding? None of my cheapskate friends will spend that kind of money on me. I'll gladly settle for *Red Baron* from Dynamix. It lets you fly the unfriendly skies over Europe during World War I, dodging bullets and engaging famous foes in dog fights.

Denny Atkin Amiga Resource Editor

If money were no object, my first request to my cybernetic Santa Claus would be a custom-made RISC processor-based computer with a multitasking operating system that would run Amiga, Macintosh, and MS-DOS programs. Finally I wouldn't have to wait (or beg) for ports of my favorite games from machine to machine. In a more realistic vein, though, I'd settle for the new Amiga 3000T computer, with a 68040 processor board, an A2410 Lowell graphics board, a nice 19-inch multisync monitor, and a col-

Stephen Levy COMPUTE Books Editor in Chief

A notebook. A place to jot down my most profound thoughts, keep track of important appointments, catch up on the writing and editing I didn't get done during the day, and yes, of course, play my most current game in-fatuation. One like the 20-MHz Tandon NB/386SX.

The Tandon NB/386SX weighs in at just 6.5 pounds and measures the same as the notebooks you'll find in any stationery store, a mere 8.5 × 11 × 2.1 inches. But I'll need more than just the standard one parallel and two serial ports. Better include the optional 2400-baud modem so I can communicate with . . . well, I do enjoy playing games online.

The NB/386SX comes with a stan-



dard 40MB hard drive and 2MB of RAM, but Santa, you know I'll be running *Windows* and games that just love memory, so you'd better equip my notebook with the optional 60MB hard drive. And even though the Tandon can handle a full 16MB of RAM, I'll settle for just 4MB. Next year I'll be able to write my list at 30,000 feet.

Clifton Karnes Editor

I want just one thing for Christmas—Stacker. Stacker is a hardware and software combo from Stac Electronics that uses state-of-the-art compression technology to double the size of almost any hard disk. Amazingly, this magnetic magic doesn't cost you a bit in performance. A software-only version of Stacker is also available that operates only slightly slower. Stacker is a cinch to install. All you do is plug the coprocessor card into any free slot, run the installation program, and breathe an expansive sigh of relief. Your hard disk will be roughly twice its pre-Stacker size.

This may sound too good to be true, but it isn't. I know all about Stacker because I've installed a Stacker board in my PC at work, where it turned my 65MB hard disk into a 120MB jumbo. Now I'm dying to get

Stacker for my PC at home so I can transform my bulging, stuffed-to-the-gills 120MB hard disk into a whopping 240. Plus, there are new 16-bit versions available for MCA- and EISA-bus computers that promise to be even faster. So please, Santa, give me Stacker, and I'll never ask for anything else again. Promise.



or PostScript printer. This would be a fantastic productivity system. Perhaps a stocking stuffer to go with the Amiga would be a VGA 386, to play games not available on the Amiga, such as *Chuck Yeager's Air Combat*, *Falcon 3.0*, and *Strike Commander*.

It would be nice to have a collection of computers, each to run the one or two best games and applications for that particular machine. Maybe even some orphan machines to run the games that never made it to our 16- and 32-bit world of the future. However, my biggest Christmas wish would be to end the rash of sloppy,

careless ports of MS-DOS games to the Amiga platform. When companies release fantastic games like *Railroad Tycoon*, *F-15 Strike Eagle II*, and *Chuck Yeager's Advanced Flight Trainer 2.0* with operating system incompatibilities or prevent them from being installed on the hard disk, you wonder why they even bothered to port them. They would never release a PC game in such shoddy condition. Santa, please make these companies take the extra time to do their Amiga software products right, and make sure it pays off for them with better Christmas sales next year.

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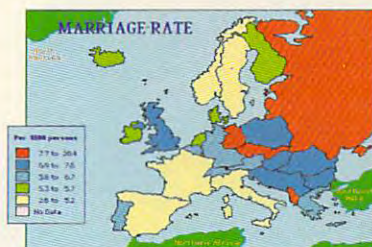
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DREAMING OF A SOFT CHRISTMAS TOP SOFTWARE PICKS FOR THE HOLIDAY SEASON 1991

Here's a list of some of the most desirable software available, both best sellers and neglected treasures.

The Ultimate Stocking Stuffer

David Sears: The one game I'd be willing to bet on this year is *Ultima VII*. Garriott's never failed me. The fact that the game is huge doesn't bother me. All the things I liked about the other Ultimas will live on in this version in spite of the 256-color factor. I've got to have that last Ultima.

A Word to the Wise

Denny Atkin: Interplay's *Lexi-Cross* is the most fun and addictive piece of computer entertainment since *M.U.L.E.* My wife and I have spent more time playing *Lexi-Cross* this year than all other games combined. It's an engaging word-puzzle game where you and another player take the roles of game-show contestants. The puzzles range from familiar to frustrating, and the graphics and sound are topnotch.

Jill Champion: *Transparent Language* forgoes the traditional tutorial method of teaching a language through repetition. *Transparent Language* is based on natural language development—learning skills by

reading. You read a literary work in its original language, displayed in the top part of your screen. As you highlight a portion of text, its English translation along with some very useful comments appear at the bottom of your screen. Eventually, you begin to understand words and phrases without consciously translating them.

Christmas Management

Pam Plaut: I'm putting *Quicken 5.0* on the top of my Christmas software wish list. *Quicken* would let me to balance my checkbook easily and keep tabs on my budget.

Robert Bixby: *GeoWorks Ensemble* can't do everything, but it is a remarkably flexible tool for desktop publishing, correspondence, telecommunications, organizing time, and keeping track of lists. If it had nothing else to recommend it, the way it makes fonts look, even when printed on a low-end dot-matrix printer, would be enough. I know this isn't the place to talk about hardware, but I've fallen in love with the RISC-driven NEC 990 Silentwriter2—the fast, silent type—a laser printer that churns out pages fast enough to match my productivity, which is rare in a model designed to sit on a desktop. It's a desktop

publisher's dream. Let me sneak in one more item of hardware: The Sony Laser Library CD-ROM System, a CD-ROM bundled with enough CDs to make the relatively heavy investment in the multimedia-ready hardware worth every dollar.

Yuletide Utilities

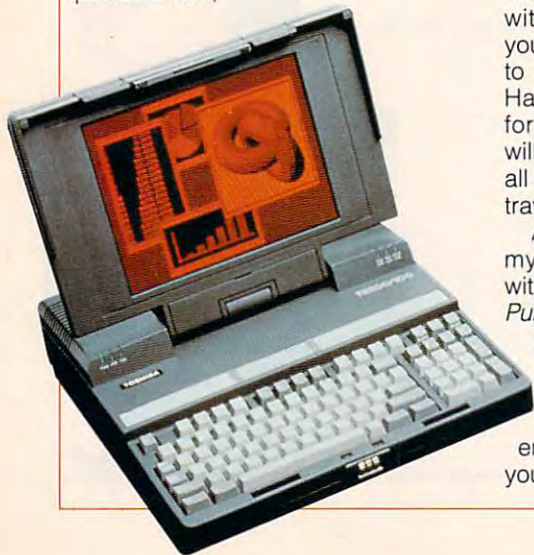
David English: Every once in a while, a program comes along that I absolutely must have. That's how I feel about *Magic Cursor!*. You can chose from among 47 oversize cursors to use in *Windows*, including arrows, pens, pointing hands (my favorite), airplanes, and lots of others. It's a terrific convenience for any *Windows* user but an absolute must for laptops.

Clifton Karnes: *Micrografx Designer* is the tops in precision illustration software. It's so versatile that in addition to taking advantage of its drawing prowess, you can use it as a typography tool, for desktop presentation, or as a CAD program. It will do just about everything, including importing and exporting almost every vector-based file format known to man—even the tough ones. And bundled with *Designer* is the *Micrografx Post-Script Driver*, an underground classic (the driver is available separately for \$199).

Pam Plaut COMPUTE Books Editor

Santa, times are tough, I know. But I've been dreaming of having my own laptop computer this Christmas. I would like a Toshiba T5200 laptop with its 100MB hard drive and plenty of memory. It has a 20-MHz 386 processor, VGA gas plasma screen, and a 3½-inch floppy drive, too. It would be just what I need.

As for a printer, I'd like a portable ink jet—perhaps a Canon BJ-10ex portable. Oh,



yeah—could you throw in a mouse with all of this? I think I'd like the Microsoft BallPoint that I can clamp to the edge of my keyboard.

And to accompany my portable set, could you throw in a few round-trip tickets to some exotic places like Casablanca, Hong Kong, and New Delhi? I'd love to get started on that novel about my adventures in far-away destinations. And make those tickets on the Concorde, please.

My system wouldn't be complete without a modem to communicate with the rest of the world. While you're at Toshiba, Santa, I'd like you to pick up the optional 2400-baud Hayes-compatible internal modem for that Toshiba laptop. My editor will be waiting anxiously to receive all the latest chapters detailing my travels. Thanks, Santa.

And then there's software to run on my new machine. Well, supply me with *Microsoft Windows* and *Ventura Publisher*, *Windows Edition*, and *Microsoft Word for Windows*. I think I can take care of the rest. Santa, you're a busy man, and I know you've received a lot of computer wish lists this Christmas. Do what you can. I'll be nice all year long.

Tom Netsel Gazette Editor

The Commodore 64 tree is a little bare this year, but that didn't stop me from bending Santa's ear with a few modest gift proposals.

Since my 64 and 1541 are starting to show a little wear and tear around their chips and sockets, I might as well put the bite on Santa for new ones. I hope he picks the Test Pilot combo, which includes the Commodore 64, 1541, joystick, and some games for about \$300. That shiny new system just screams for a speedy hard drive from Creative Micro Design. Since the guy in the red suit is footing the bill, I'll opt for the HD-200 with its 200MB capacity. More modest models include the HD-20.

While the old boy is at CMD, he might as well pick up a RAMDrive or two for stocking stuffers. These battery-backed RAM disk cartridges come in 512K, 1MB, and 2MB models. Some of us 64 users were disappointed that RAMLink was a little slow out of the shipping dock, but Santa assures me that his elves at CMD are cranking out plenty of these REUs for Christmas orders.

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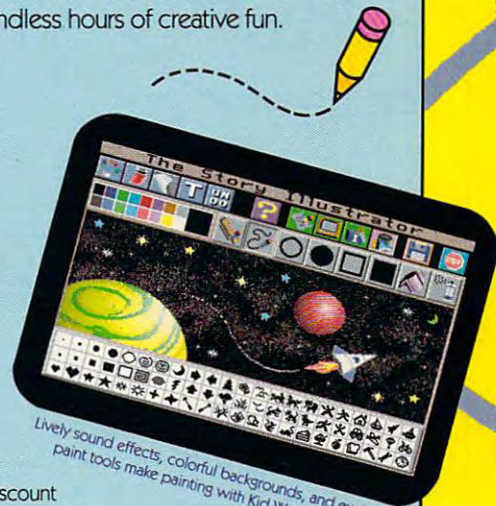
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PRODUCT INFORMATION

BJ-10ex \$499.00
(bubble-jet printer)
Canon USA
One Canon Plaza
Lake Success, NY 11042
(800) 892-0020

PC Tools 7.1 \$179.00
Central Point Software
15220 NW Greenbrier Pkwy.
Beaverton, OR 97006
(503) 690-8090

Amiga 3000T \$4,998.00
A2410 Lowell Graphics Board \$998
Commodore
1200 Wilson Dr.
West Chester, PA 19380
(800) 662-6442

HD-200 \$1,299.95
(200MB capacity)
HD-20 \$499.95
(20MB)
Creative Micro Design
15 Benton Dr.
E. Longmeadow, MA 01028
(413) 525-0023

Red Baron \$59.95
Dynamix/Sierra On-Line
P.O. Box 978
Oakhurst, CA 93644
(800) 326-6654

Magic Cursor! \$49.95
Fanfare Software
9420 Reseda Blvd., Ste. 828
Northridge, CA 91324
(818) 886-8787

GeoWorks Ensemble \$199.00
GeoWorks
2150 Shattuck Ave.
Berkeley, CA 94704
(800) 772-0001

Lexi-Cross \$39.95
Interplay Productions
3710 S. Susan, Ste. 100
Santa Ana, CA 92704
(714) 549-2411

Quicken 5.0 \$69.95
Intuit
P.O. Box 3014
Menlo Park, CA 94026
(415) 322-0573

Micrografx Designer \$695.00
Micrografx
1303 Arapaho
Richardson, TX 75081
(800) 733-3729

BallPoint Mouse \$175.00
MS-DOS 5.0 \$99.95
Windows 3.0 \$149.00
Microsoft
One Microsoft Way
Redmond, WA 98052-6399
(800) 426-9400

NEC Silentwriter2 Model 990
\$4,495.00
NEC Technologies
1414 Massachusetts Ave.
Boxborough, MA 01719
(508) 264-8000

Ultima VII \$79.95
Origin Systems
P.O. Box 161750
Austin, TX 78716
(800) 999-4939

The Oxford English Dictionary
\$950.00
Oxford Electronic Publishing
200 Madison Ave.
New York, NY 10016
(212) 679-7300

Sony Laser Library CD-ROM System
\$699.00
Sony Corporation
of America
Computer Peripheral
Products
655 River Oaks Pkwy.
San Jose, CA 95134
(800) 222-0878
(408) 432-0190

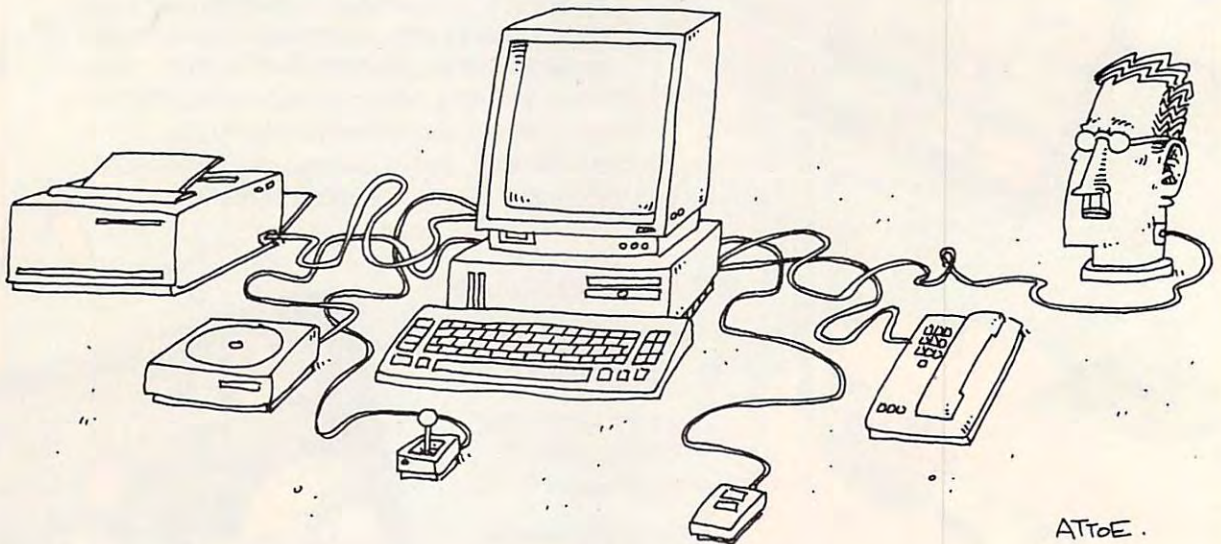
Stacker MC/16 \$299.00
(for MCA bus computers)
Stacker AT/16 \$249.00
(for 16-bit ISA bus computers)
Stacker XT/8 \$199.00
(for 8-bit ISA bus computers)
Stacker \$149.00
(software only)
Stac Electronics
5993 Avenida Encinas
Carlsbad, CA 92008
(800) 522-7822

Tandon NB/386SX/20 \$4,449.00
Tandon
405 Science Dr.
Moorpark, CA 93021
(800) 800-8850

Toshiba T3200SXC \$7,249.00
Toshiba America Information Systems
9740 Irvine Blvd.
Irvine, CA 92718
(800) 334-3445

Transparent Language \$95.00
Transparent Language
9 Ash St.
P.O. Box 575
Hollis, NH 03049
(800) 752-1767

ZEOS 386-33C \$3,295.00
ZEOS International
530 Fifth Ave., NW
St. Paul, MN 55112
(800) 423-5891

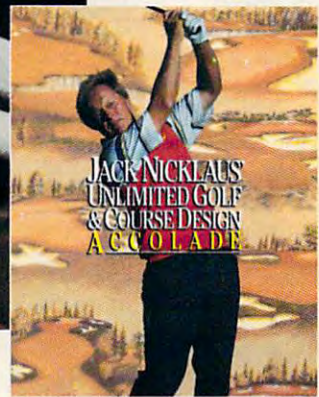


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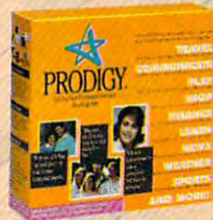
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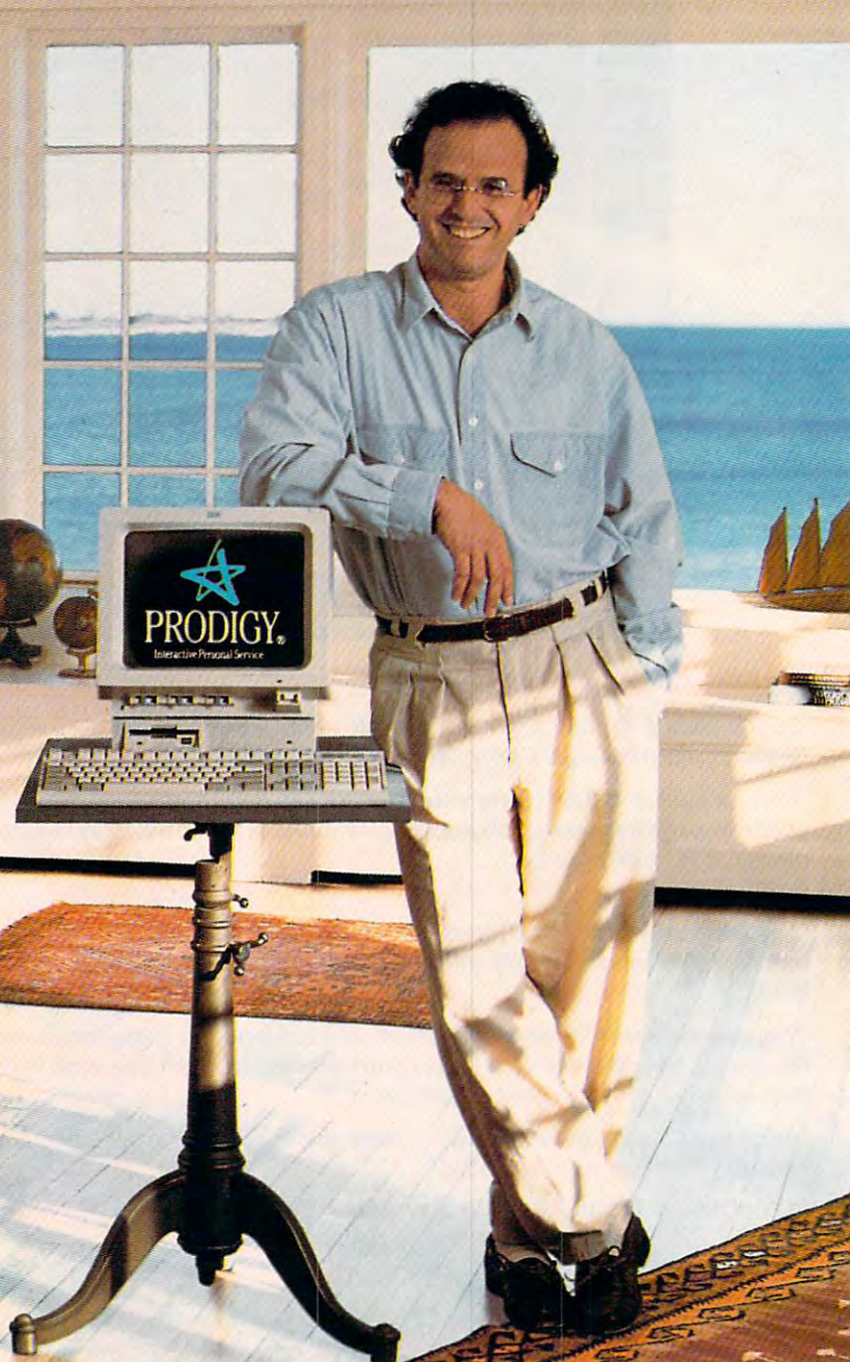
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PEACE ON EARTH

BY SHERRY ROBERTS

So far, no one has written a classic Christmas carol about computers. Few people deck the halls with computer cables, and even fewer jingle computer chips while sleighing through the snow.

But the fact is that in today's high-tech world, computers play an increasingly important role in maintaining stability and peace on earth.

In organizations such as the American Red Cross and the National Weather Service, computers help protect us, warn us of danger, and rescue us from catastrophe. Computers are also helping farmers and aid workers in famine-prone areas to reduce world hunger.

M

High-Tech Volunteerism

VITA (Volunteers In Technical Assistance), a nonprofit organization founded in 1959 to facilitate economic growth in developing countries through technical information, uses computers to make possible dairy farms, training schools, and printing companies in countries such as Chad.

VITA has designed a communications program using packet radios, computers, and a low-earth orbiting satellite called VITASAT that enables farmers in remote Sudan to plug into highly technical resources. VITA president Henry Norman says requests for technical information are answered by 5000 skilled volunteers.

Since 1988, VITA's Disaster Information Center has operated an electronic bulletin board called VITANet to track offers of relief assistance, time, money, and commodities. When a disaster is declared, volunteers enter offers of help into a database that can be accessed and downloaded by subscribers.

Disasters such as the Armenian earthquake may generate 500-1000 calls. More than 100 agencies access the information by computer for use in their relief and rehabilitation efforts.

Overcoming Famine

Computers have made possible new inroads into famine relief in seven drought countries in Africa—Ethiopia, Sudan, Chad, Burkina Faso, Niger, Mali, and Mauritania. Agricultural, economic, and meteorological conditions are monitored in those countries by the Famine Early Warning System.

Tulane University started developing the Famine Early Warning System for the U.S. Agency for International Development in 1985. Software packages created by the project's researchers analyze information gathered by satellite imagery and field workers—such as reports on the progress of the rainy season, the development of vegetation, and harvests—and issues bulletins used by relief agencies to predict food shortages and to plan shipments.

Marian Mitchell, operations specialist, runs the Early Warning software on 386-class computers. Fieldworkers use NEC Pro Speed laptops.

"It used to be that people on the ground knew what was going on but the information did not get back to the States until there was a crying need for food," Mitchell says. Now, thanks to computers and the Famine Early Warning System, relief officials can have as much as a three-month lead on famine.

A Change in the Weather

Catching the lead on disaster is also the job of National Weather Service

computers, which generate global and regional forecasts.

Increasingly powerful computers have improved the weather service's forecasting edge, which in turn saves property and lives.

According to Wayman Baker, deputy chief of development at the National Meteorological Center in Camp Springs, Maryland, in 1955 (precomputer), the weather service was capable of producing a reasonably accurate 1½-day forecast. Today the weather service can provide a 4½-day forecast with the same accuracy.

Using a Cray—the world's fastest computer—the weather service issues a ten-day global forecast and a 48-hour regional forecast every day.

When Disaster Strikes

Many lives are saved by the advanced weather warnings made possible by the computers at the National Weather Service, but when disaster is unavoidable and lives and property are in harm's way, people look to the American Red Cross—and its computers—for help.

Computers used in national disaster operations are warehoused in three locations—Cleveland, Dallas, and Burlingame, California. From those sites they can be shipped anywhere in the mainland United States, Puerto Rico, the Virgin Islands, and U.S. Pacific possessions within 24 hours.

This inventory consists of about 100 pieces of hardware: IBM PS/2 stand-alones, printers, Novell local area networks, and IBM 80 file servers.

The Red Cross has sent computers into the field for only three years, according to Armond Mascelli, manager of operations and technical support for disaster services. The organization tried using computers on relief operations in 1976-77. However, the process, which involved field workers traveling to a mainframe computer at night to process data, was tremendously cumbersome and was discontinued.

"Automation for disaster was put aside," Mascelli says. "Then when the PC explosion happened, it was the right piece of technology for the problem. Portable computers with a lot of memory and capable of running large databases and applications became useful for disaster-type activities.

"On the planning side, we use computers to try to anticipate where disasters are going to happen," Mascelli says. Using *Conquest*, a commercial demographics analysis program, the Red Cross pinpoints disaster-prone areas, such as hurricane-plagued coastal areas, and assesses what types of services will be needed in the event of

a disaster. Analyzing demographics— income levels, degree of home ownership, age of homes (were they built before earthquake building codes?)—provides good indicators to gauge probable relief needs.

Although the computers are popular in the field, they cannot be used in relief operations where the environment is too hostile for computers, such as when Hurricane Hugo knocked out power on whole islands.

While the American Red Cross is the first to use computers extensively in disaster services, Red Cross societies around the world are watching this high-tech experiment closely.

Computers also help run Red Cross blood services. In the Washington, D.C., headquarters and 52 local centers they perform functions from day-to-day donor operations to donor deferral (an updated list of disqualified donors) and rare-donor registry.

The rare-donor registry tracks more than 11,000 donors with rare blood types. When a pregnant woman with a very rare blood type in England required a blood transfusion at delivery, a computer search found a matching donor in Michigan in just hours.

In day-to-day operations, computers are used to record medical history of donors as well as the test results of every unit of blood, information on which hospital received the unit, and what components were made from it.

Elizabeth Hall, a spokesperson for blood services at the Red Cross, says this is not a simple chore. In the United States the Red Cross collects 20,000 donations of blood per day—that's six million units of blood a year. From these, fifteen million blood components are transfused into as many as four million patients.

"We have gone from manual entry at every level to completely automated systems where testing equipment sends messages to the central computer in the blood bank so they can never be recorded wrong," Hall says.

The accomplishments of the Red Cross are even more impressive when you realize that it struggles along with a mishmash of computer systems. Hall notes that each donor center has different software and hardware. And so the Red Cross has set a lofty goal: By December 1993, every donor center and Red Cross facility in the country will be online with one national computer system. The budget for the entire program is estimated at \$120 million.

Critics aren't sure the American Red Cross can pull off this daring computer project. But if it does, it will be a giant technological step for mankind and certainly worthy of a Christmas carol. □

TEST LAB

Mail-order companies offer a relatively inexpensive way to add mountains of mass-storage capability to your computer. To help you decide whether mail-order hard drives are for you, this month's Test Lab focuses on ten hard drives and the six mail-order companies that provided them for testing and review. Along with test data and reviews discussing the performance of these drives and companies, Test Lab explains the hard drive technologies and offers several tips on purchasing hard drives. One of our drive testers commented, "Purchasing a hard disk via mail order can be a double-edged sword: It can save you lots of money, or it can also be a nightmare. How it turns out depends on the information you have about your computer system and the questions you ask the sales representative when you call to order the drive." This month's Test Lab will help you make sure that the sword cuts your way.

CONNER CP3184

With Conner's CP3184, you get more than 80MB of exceptionally quiet hard drive storage.

This drive is so quiet, in fact, that I often found myself touching the drive in search of some vibrational tingle to confirm it was operational, since there is no hard drive access indicator light (nor the pins to attach an external LED indicator). While having a quiet drive is great, most folks like a reassuring LED to provide visual notification when the drive is being accessed for reading or writing.

Installing the drive taught me a great deal about the importance of understanding the drive technology before ordering. This Conner IDE drive wouldn't hook up as a secondary drive to my current RLL controller driving a Seagate ST-251-1, so I disconnected the existing drive and controller in an attempt to install the

CONNER CP3184
Supplier: Hard Drives International
Price: \$379 Capacity: 84MB
Controller/Interface: 16-bit IDE
Condition as Received: unformatted, no DOS, 16-bit IDE hard/floppy controller card, 40-pin dual cable, DM (Disk Manager) software, mounting rails with screws, Hard Drives installation/reference manual

Conner alone using the supplied IDE card. Accent should go on the word *attempt*.

The drive came with no cylinder, head, or sector/track specs, so I placed a call to Hard Drives International's technical support for the information required by the BIOS setup screen on the 386SX test system. The tech support folks provided the drive specs in a matter of minutes, but I found no listing of a drive type fitting these specifications in the setup menu.

Although no one at tech support could help me right away, when I called a second time, a technician did call back. He left a message on the lab's answering machine with a reference number for me to use when calling him back. I called HDI the next morning using the reference number, and a technician talked me through the procedures to install the drive with the supplied *Disk Manager* program using a drive type that was close to the Conner in specifications. He warned me to bear in mind that this might not work with my current BIOS. (My Everex has a December 1987 BIOS date.)

I followed the prescribed procedures to format the drive, and, sure enough, it didn't work. Then I decided to install the drive on a computer that had a newer BIOS version which permitted user-configurable hard drive types. Installation proceeded on this machine without any problems.

While the original Everex BIOS date doesn't seem overly ancient



to me, it couldn't accommodate the Conner drive. The HDI representative said that I could always order a newer BIOS chip set from Everex as a solution to the problem. The documentation that came with the drive makes no mention of possible incompatibility problems such as these.

Hard Drives International supplies its generic installation/reference manual along with an IDE installation data sheet—a nice touch, as sometimes original manufacturer documentation is difficult to wade through. Lots of general information is provided along with specifics on how to configure jumpers, attach cables, and the like, although I found no mention of mixing an RLL drive and an IDE (or SCSI) drive on the same system. The lesson in all this, of course, is that it pays to talk to a vendor *before* you buy to find out how your system might or might not work with a hard drive or controller.

Once the installation was completed on a new 386DX machine with a later model BIOS, the half-height Conner drive performed as expected. I installed MS-DOS 5.0 and treated the entire 82MB (formatted capacity) as one large partition. Speed, access time, and overall operation were average—this quiet, reliable Conner drive makes a good choice as a primary or secondary drive when connected to an IDE controller.

PETE CLARK

Circle Reader Service Number 301

TEST LAB

KALOK KL3100

The compact Kalok KL3100 100MB drive from Professional Hard Drives fits nicely into one half-height bay and includes all the mounting hardware you'll need. Just make sure your computer can handle the IDE interface.

Initially I didn't know about the IDE incompatibility with my system, so when I installed the Kalok with its IDE controller, my 386SX locked up, and I couldn't boot from any drive. After searching through the poor documentation for a clue as to what the problem might be, I made a toll call to Professional Hard Drives in Houston. The only person who could help me wasn't there, and I was asked to call back in half an hour. When I did call back, the technician said that it would be impossible to install the Kalok in my computer as a second hard drive because of its IDE controller. A definite point to remember if you're considering this as a choice for your second hard drive.

Disabling my primary drive wasn't enough, as I learned in another call to tech support; I had to remove the existing controller card completely and use only the IDE controller in this system.

Removing the old controller card enabled me to boot from the floppy, but I received an error message telling me that I had an invalid media track when I tried to access the hard disk. Since I couldn't find a solution in the manual and the drive did not match up with any drive type in my CMOS setup, I made yet another call to tech support. This time the folks at Professional Hard Drives felt they couldn't remedy my problem and suggested I call Kalok tech support in California.

Kalok was, thankfully, right on the ball. Its tech support rep patiently stepped me through the process from the start and provided a CMOS drive type designation that was similar to (and compatible with) my configuration. He stayed on the line to make sure eve-

KALOK KL3100
Supplier: Professional Hard Drives
Price: \$319 Capacity: 100MB
Controller/Interface: 16-bit IDE AB-8388 AT Bus Card
Condition as Received: unformatted, no DOS, 16-bit IDE hard/floppy controller card, 40-pin dual cable, mounting rails with screws, installation manual

rything was completely operational before disconnecting.

Physically, the drive looks like any other half-height. Performance, however, is another matter. Once installed and formatted, the Kalok proved to be truly speedy, delivering random seek performance even better than the figures in the Kalok manual.

I can't really fault this drive for the problems I encountered; I wish the documentation and support from Professional Hard Drives had been stronger, however. If you're running a computer with a late model BIOS and looking for a fast drive, this Kalok KL3100 is a good choice.

BOB LEVY

Circle Reader Service Number 302

MAXTOR 4170S

Corporate Systems Center's Maxtor 4170S provides over 150MB of storage—plenty to handle today's mega-applications—and with the FastCache 32 SCSI



controller CSC sent along, its performance is plenty fast.

If you're like most hard drive users, you find yourself accessing the same portions of your hard drive time and time again because you tend to use the same applications over and over again. The result is 100-percent wear on a hard disk that you may use only 10 percent of on any given day. This mechanical stress can eventually result in hard disk failure and loss of important data.

To the rescue come RAM-rich disk controllers, which can prolong the life of the average hard drive. Simply put, information repeatedly used by your hard disk, such as a word processor or a spreadsheet, can now be loaded simultaneously into both your system's memory and an optional RAM cache on a hard drive's interface board. The RAM cache, which has no moving parts to wear down, will then be accessed as the primary memory source if you should need the

TIP 1: KNOW WHY YOU'RE BUYING

Analyzing your need will go a long way in determining what type of hard drive you should purchase. The main reasons are usually to replace a dead or ailing existing hard disk, to gain additional storage space, or to move large amounts of data from one computer to another conveniently. If you merely want to replace an existing drive that has seen better days, the least expensive and least complicated route will be to order the same make and model of your exist-

ing drive or one of the same type but perhaps a higher capacity. To gain additional storage, the safest bet would probably be to order the same model or a similar model that will work with your existing controller as a second drive. For portable media, you should consider a removable hard drive or a hard card. Knowing your needs will help you make the best choice for your budget.

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TEST LAB



MAXTOR 4170S
Supplier: Corporate Systems Center
Price: \$499 Capacity: 154MB
Controller/Interface: SCSI
Condition as Received: unformatted, no DOS, mounting kit, SCSI Fast Cache Card and cables, 7MB RAM (SIMM configuration) for Cache Card

same information again. This way, the hard disk and its mechanical drive heads are spared the effort of repeatedly seeking and sending the same data.

The FastCache 32 from Corporate Systems Center, a SCSI controller board with expandable RAM capacity, has been offered with Maxtor hard disks to enhance the performance and prolong the life of the drives. The full-height internal hard drive requires either a full bay or two half-height bays. Either way, you can say bye-bye to a couple of half-height drives or get yourself a bigger system cabinet.

The installation of this drive and controller turned out to be more difficult than I expected. The drive itself comes with nothing but foam packing and a technical specifications manual, which didn't provide all the answers I needed. If you don't purchase the FastCache 32 card with the drive, you'll need to buy a SCSI interface, mounting rails, and ribbon cable to complete the installation. Before you buy any drive, be sure to find out what you're getting and what you'll need.

The FastCache 32 card comes with a manual and a setup disk; I found the documentation to be abysmal. The only photos to guide the inexperienced installer were located in the rear of the manual and dealt with installing additional SIMM chips on the board. The manual assumes that everyone's an expert at installing a SCSI hard drive with a cache board. Because I couldn't find vi-

tal information in the manuals, I had to place four separate toll telephone calls to CSC technical support in California to walk me through what should have been a simple installation. These phone calls dealt with issues like DIP switch settings to reflect RAM configurations, controller access preferences, and other topics that should have been covered in the documentation.

Once up, the drive performed without a hitch. The RAM cache made the Maxtor's performance speed go off the charts. *SpinRite* reported processing speeds of 3 ms—far faster than the drive itself was capable of. Without the cache, the drive performed as would be expected, with a respectable 15-ms seek time and fairly quiet operation.

If you don't mind the size of the drive and the lack of documentation, CSC's Maxtor drive and Fast-

Cache 32 make an impressive team. But be sure you are receiving all that you need if you plan to purchase the drive without the FastCache 32. Overall, the drive/card combination impressed me almost enough to forgive the lack of adequate documentation—almost.

BOB LEVY

Circle Reader Service Number 303

PLUS HARDCARD II XL50

The thin size and "unibody" construction of the Plus Hardcard II XL50 don't really give you an indication of the truly awesome performance this unit delivers. Admittedly, I was skeptical about whether this hard-drive-on-a-card supplied by Bulldog Computer Products would install as painlessly as advertised and also perform at the 9-millisecond access time advertised.

As well as the Hardcard was designed, though, during the installation process a few problems did arise. The one-piece drive and card unit, filling a full-length expansion slot, wouldn't work on an old IBM AT (6 MHz) running MS-DOS 3.3. However, a quick five-dollar flat-fee phone call to Plus technical support revealed that the problem stems from a quirk in the IBM processor itself. This peculiarity

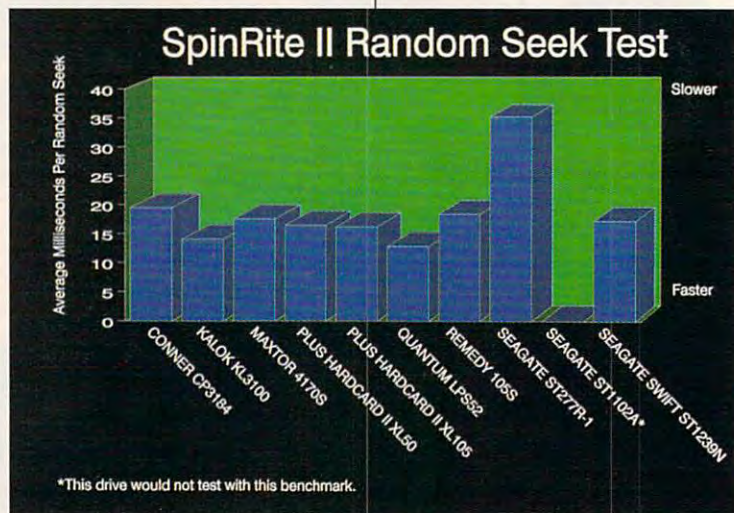




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TEST LAB

makes MS-DOS unusable with the Hardcard on my machine. (PC-DOS, however, functions just fine with the software patch program provided with the drive.) The quirk has something to do with one high bit that IBM changed in the old AT BIOS since my machine was released (January 10, 1984). Tech support suggested that I switch over to PC-DOS and run the patch program to alleviate this incompatibility problem. Since I didn't have a copy of PC-DOS available, I decided to do the installation and review on another machine.

I then installed the Hardcard on a 386SX under MS-DOS 3.3 and found the rapid automatic installation a remarkably painless procedure that could be followed to a T with one small exception. The installation was complete in a couple of minutes. However, I then realized that my existing C and D drives had become C and E, and the Hardcard had interjected itself as a 32MB D drive. What had happened to the other 18MB of Hardcard space? It was, after all, supposed to have a 50MB formatted capacity.

Since MS-DOS 3.3 can recognize partitions only up to 32MB, the solution was simply a matter of returning to Plus's installation software, selecting manual partitioning, and creating an 18MB F drive. The excellent Plus user's manual provides lucid, detailed in-

TIP 2: KNOW YOUR PRESENT CONFIGURATION

Know your present computer system configuration. You should write down essential information about your computer system including the BIOS date and type; what version of DOS you're running; what kind of hard drive controller you presently have in your system; and the capacity, make, and model of your existing hard drive. You'll be able to gather most of this information from the user's manual that came with your computer or from diagnostic software like *The Norton Utilities* or *Check-It*.

—TOM BENFORD

PLUS HARDCARD II XL50

Supplier: Bulldog Computer Products
Price: \$389
Capacity: 52MB
Controller/Interface: ERL
Condition as Received: low-level formatted, no DOS

structions on how to do this.

The drive is a superquick star performer, exceeding even its published specs. And it's quiet, too—completely inaudible over the hum of the system's cooling fan. Only during intense data-write testing could I hear any sound at all.

Since the Hardcard mounts internally in an expansion slot, you don't have the benefit of a drive access light commonly found on standard hard drives. The Plus engineers have thoughtfully provided a utility that generates a flickering plus sign in the upper corner of the video display whenever the Hardcard is accessed. (You can optionally disable this feature if you so desire.)

The Plus Hardcard II XL50 proved to be a well-engineered piece of equipment. It's an excellent choice for the novice user who wishes to install a mass storage device that's also easily removable. I give the Plus Hardcard my highest recommendation for ease of installation and for the best telephone technical support that I received.

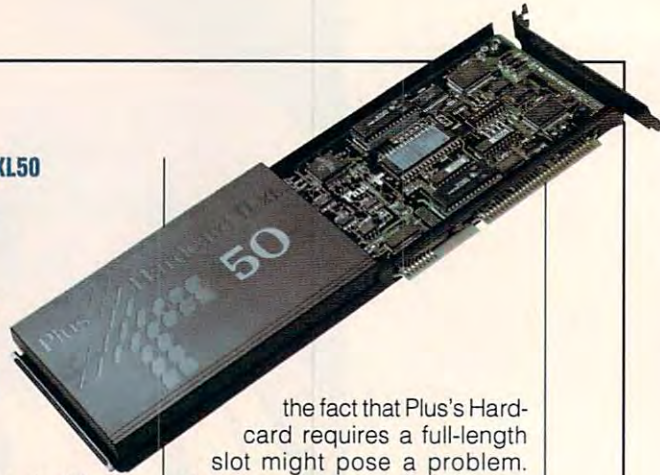
SCOTT MEGILL

Circle Reader Service Number 304

PLUS HARDCARD II XL105

This hard-drive-on-a-card is a screamer! Not only does it provide excellent capacity, but it's lightning fast and a breeze to install. But I'm getting ahead of myself; let's start at the beginning.

If available expansion slots are at a premium in your computer,



the fact that Plus's Hardcard requires a full-length slot might pose a problem. However, if all of the available bays on your system are already occupied with a couple of floppy drives and a hard disk and you still need more storage, then you should definitely take a look at the Plus Hardcard II XL105. This drive could be your ticket.

After successfully installing the Hardcard II in just a few minutes without incident, I could tell that Plus Development had spent lots of time designing the hardware, installation software, and user's manual. Inserting and using this device is extraordinarily easy, even if you've never installed any hardware before. To aid the installation process, there's a totally automatic mode that makes all of the decisions about partitioning and other pertinent aspects of the technology for you. In most cases, the automatic selections work just fine, but there's also a manual mode should you decide to override these computer-chosen defaults.

After completing the installation in less than 15 minutes, I had three 32MB partitions and one 7MB partition (a total of 103MB formatted capacity) running under MS-DOS 3.3. The trim unit is less than an inch wide, allowing it to fit comfortably in a single card slot.

While the Plus Hardcard doesn't have a drive access LED like those on conventional hard drives, a light utility is provided in the setup software which provides a plus symbol in the upper right-hand corner of the monitor whenever the drive is being read from or written to. This is a nifty feature which, like everything else about the Hardcard, is well

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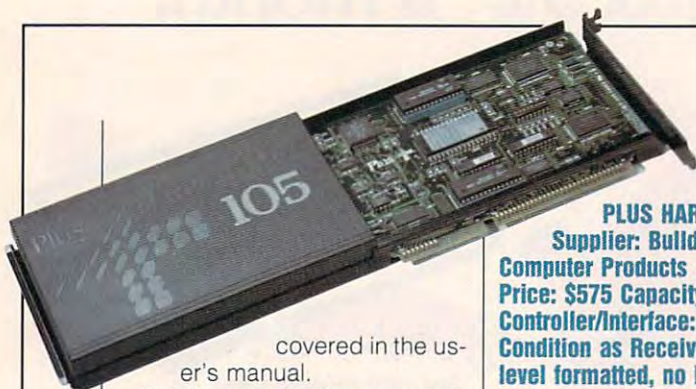
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TEST LAB



covered in the user's manual.

Bulldog didn't offer me tech support on this drive but did refer me to the manufacturer's tech support service. While no telephone tech support was really required during this installation, I know from experience that the tech support department at Plus Development is thorough, helpful, patient, and conscientious. At a flat \$5 fee for a tech support call, it may well be one of computerdom's great bargains. If you have an open card slot and would like your computer to have additional hard drive space, the Plus Hardcard II XL105 is definitely worth looking into.

PETE CLARK

Circle Reader Service Number 305

QUANTUM LPS52

The miniaturization of electronic devices and components, a byproduct of technological advances, has made a clearly positive impact on the world of personal computers. The compact laptop computers of only a year or two ago are quickly giving way to even more diminutive notebook models. Hard drives, too, have steadily decreased in physical size while their capacities have grown by leaps and bounds. The original IBM XTs came outfitted with a full-height 10MB hard drive that could do double duty as a boat anchor. Then half-height drives appeared on the scene. Now Quantum's LPS52 drive takes size reduction to the next logical step with a design that's only one inch thick.

A sleek piece of equipment, this inch-high Quantum drive has a formatted capacity of 50MB and uses VLSI (Very Large Scale Inte-

PLUS HARDCARD II XL105

Supplier: Bulldog

Computer Products

Price: \$575 Capacity: 105MB

Controller/Interface: ERL

Condition as Received: low-level formatted, no DOS

gration) technology to pack a great deal into a remarkably small package. The drive sports a built-in access indicator light, and you get an additional two-pin jack to rig an extension LED indicator for hidden mounting situations—a nice touch. I like to be able to see some indication of hard drive activity and know that the file I meant to save is actually being saved.

The drive came supplied with a mounting kit and an IDE floppy/hard controller card, but I opted to plug it into my existing IDE controller. Even though it's about half the thickness of an ordinary half-height drive (you can fit two of these into the same mounting bay), the supplied mounting kit documentation assures you that it will nestle comfortably into any half-height opening.

I partitioned the drive with FDISK in a matter of minutes, loaded MS-DOS 5.0, and was up and running in under ten minutes—from start to finish. This was truly a painless installation, and on the basis of this pleasant experience, I would recommend this particular drive/controller combination as a good choice for someone in-

QUANTUM LPS52

Supplier: Hard Drives International

Price: \$239 Capacity: 52MB

Controller/Interface: 16-bit IDE

Condition as Received: unformatted, no DOS, 16-bit IDE hard/floppy controller

card, 40-pin dual cable,

DM (Disk Manager) software,

mounting rails with screws, Hard

Drives installation/reference

manual

stalling a drive for the first time.

I found the supplied installation instruction sheet easy to follow, something a user of any experience level can and will appreciate. If you follow the step-by-step directions precisely, calls to tech support shouldn't be necessary.

The drive noise was about average for an IDE drive—much quieter than the older, larger drives I've used. As far as performance goes, the drive is quick—much faster than the old trusty Seagate ST-251-1 that usually resides in my test system. Easy installation, good documentation, and good performance earn this drive my high recommendation.

STEVE MAREK

Circle Reader Service Number 306

REMEDY 105S

The idea of a removable high-capacity hard drive appeals to many users, and the design of SPC's Remedy models makes this scheme a practical reality.

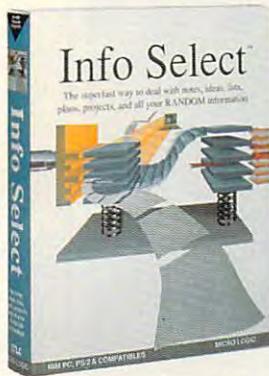
Essentially, the Remedy 105S drive is a streamlined 3½-inch unit that docks inside a 5¼-inch frame—physically the same size as a standard 5¼-inch half-height drive. The frame installs inside the PC with four screws and is the permanent (nonremovable) part of the installation. The drive itself slides into this frame and clicks into place, making contact with an edge connector at the rear. Removal of the drive is simply a matter of pulling it out of the frame—in effect, the drive itself is a cartridge which snaps into



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Patrick Marshall,
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Editor's Choice
"First rate"
PC Magazine

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place in the bay. Of course, in order to be able to remove the drive from the frame, you need to mount it in a bay accessible from the front of the PC.

The Remedy 105S came supplied with a Future Domain TMC-860 SCSI interface card for controlling the unit and a 50-pin ribbon cable for connecting the card to the drive. A good user's guide, supplied with the Future Domain SCSI card, made the physical hardware installation simple and straightforward with no special skills or technical knowledge required; all required screws, cabling, and other hardware were supplied.

I installed the Remedy 105S in a 386SX PC which already contained a 40MB Seagate ST-251-1 with an RLL controller card. According to the documentation, installing the Remedy as a second drive shouldn't have posed a problem, since the new drive was SCSI-interfaced. Actually, installation turned out not to be quite as straightforward as expected.

When the PC was powered up, it would boot normally. But since

STORAGE MEDIA TESTS

Regardless of the speed and computing power of a computer, the storage devices are often a bottleneck. COMPUTE's *BenchMark* program performs four different tests that can help rate the speed of a drive.

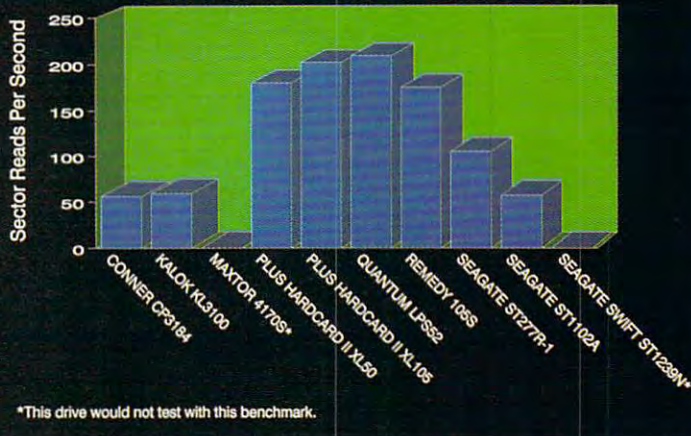
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—RICHARD C. LEINECKER

Fragmented Sector Read Test



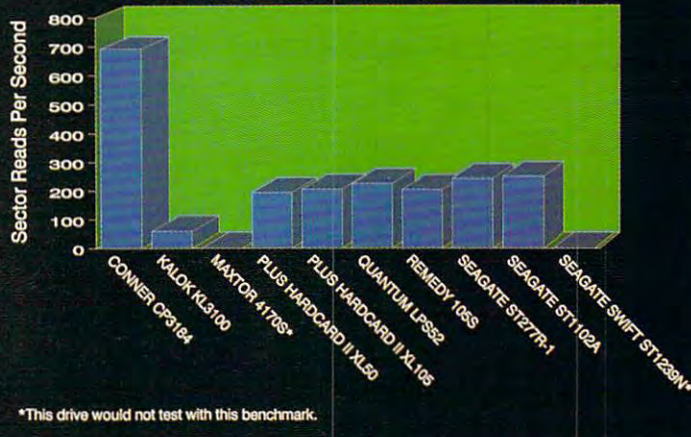
the existing drive was already partitioned as C: and D:, a conflict existed with the new Remedy drive, which was also partitioned as C: and D: as shipped. The PC recognized the C: section of the Seagate drive but looked at the Remedy for Drive D:. The location of the D: partition of the Seagate and the C:, E:, and F: partitions of the Remedy drive remained a mystery.

To try to rectify the problem, I made a call to SPC tech support. After several unsuccessful attempts at finding a cure to this incompatibility, SPC suggested that repartitioning the existing Seagate drive might be the best

solution. Since my data on that drive isn't expendable, I opted to disconnect it totally and run the Remedy as the sole hard drive on the system. I didn't really need the Seagate drive operational to proceed with the review, so this was my work-around. Without the Seagate running interference or competition, the Remedy booted and performed flawlessly from that point on.

The drive came with DOS 3.3 already installed, but I wanted to upgrade the drive to DOS 5.0 and eliminate the partitions in order to have one nice, large 105MB drive to work with; the upgrade went off without a hitch. I

Contiguous Sector Read Test



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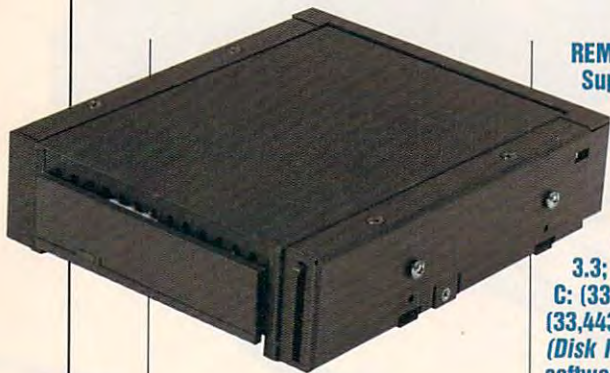


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REMEDY 105S
Supplier: Systems Peripherals Consultants
Price: \$945
Capacity: 105MB
Controller/Interface: SCSI
Condition as Received: preformatted with DOS 3.3; partitioned as drives C: (33,148,928), D: (33,443,840), E: (33,443,840), and F: (4,571,136); DM (Disk Manager) partitioning software and device driver DMDRVR.BIN preinstalled on the drive along with a CONFIG.SYS file reflecting the presence of the partitioning driver

was very impressed with the Remedy's speed—especially knowing how slowly by comparison my 28-ms Seagate ST-251-1 usually performed in this same machine.

If you're interested in a removable mass storage medium and particularly if you have data you'd like to be able to transport conveniently between two or more computers, the Remedy 105S is a convenient and efficient (albeit expensive) solution.

TOM BENFORD

Circle Reader Service Number 307

SEAGATE ST277R-1

I've had some bad experiences installing and reviewing mass storage devices in the past, so when I pulled this drive out of the box, I breathed a sigh of relief. The general consensus here at the lab was "It's a Seagate. We'll have this drive up and running in a matter of minutes." Little did I know that the projected half-hour installation was to turn into a nightmare of the first order.

The physical installation of the Seagate ST277R-1 drive and the RLL controller card into the test system went without a hitch, but

severe error messages during the disk partitioning segment of the setup (using the included *Disk Manager* software) indicated that I had a DOA (Dead On Arrival) on my hands. A call was placed to Hard Drives International's tech support department, and I described the problems. The technician agreed that it sounded like the drive was inoperable and provided me with an RMA (Return Merchandise Authorization) number. I also mentioned my really tight schedule and asked if the replacement unit could be shipped using my Federal Express account number.

The Hard Drives International representative responsible for

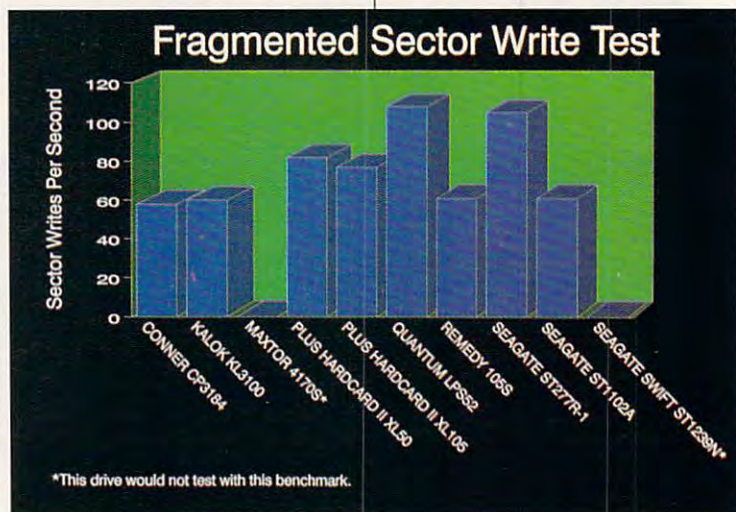
helping me work out my problem was most accommodating and assured me that a replacement unit would ship as soon as the defective unit was returned. I didn't mention that I was reviewing this unit for *COMPUTE* because I wanted to see the kind of treatment an average customer would receive. HDI usually ships via ground delivery service, which takes longer than the overnight air service I requested at my expense.

Upon receipt of the replacement unit (within 48 hours after my call), I proceeded to install the drive and controller card in my computer. My Everex CMOS setup screen didn't show a drive type with the same number of cylinders, sectors, and capacity as the Seagate drive's, so I opted to let the *Disk Manager* software select the correct type and write the ID info to the CMOS registers.

When I loaded FDISK to repartition the drive, it indicated that the drive capacity was only 31 megabytes; *Disk Manager* had obviously chosen the incorrect drive type. I made another call to tech support at Hard Drives International and was advised to "pick something close to that configuration from the CMOS menu—it should work." It didn't.

Another call to tech support elicited the advice that I purchase "upgraded ROMs for [my] computer

All Benchmark/Performance Testing is conducted by Computer Product Testing Services (CPTS), an independent testing and evaluation laboratory based in Manasquan, New Jersey. Every effort has been made to ensure the accuracy and completeness of this data as of the date of testing. Performance may vary among samples.



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SEAGATE ST277R-1
Supplier: Hard Drives International
Price: \$319
Capacity: 65MB
Controller/Interface: RLL
Condition as Received: unformatted, no DOS, 16-bit RLL hard/floppy controller card, DM (Disk Manager) software, mounting rails with screws, Hard Drives installation/reference manual

that will allow user-definable drive configurations." This option was not viable (or desirable) at the time, so I moved the drive and controller card over to another 386 with a newer AMI BIOS that does permit user-definable drive configurations.

With drive and controller installed in the 386DX chassis, I selected type 47 (user-definable) from the setup menu, keyed in the specs, and proceeded to format it from the command line. The drive formatted to 62MB without further incident.

After they work with IDE and SCSI drives, it's easy for today's computer enthusiasts to become jaded and spoiled by their quick speed. The Seagate ST277R-1 is not a contender for the *Guinness*

Book of Fast Drives. I could tell a difference in performance. Though the drive is rated at 28 ms, it consistently clocked slower seek, contiguous/fragmented sector read, and write times than this rating. Waiting for the drive to access and load files frequently became tedious, and writing data to the disk seemed to take an inordinately long time.

As with other drives supplied by HDI, this one came with fairly detailed documentation. However, it gave no advice on how to proceed with an installation on a machine like my Everex.

If you're running an older drive under RLL controller technology, this might be a good choice to replace it. Be prepared to settle for older technology and slower access speeds, however.

STEVE MAREK

Circle Reader Service Number 308

TIP 3: DETERMINE WHERE THE NEW DRIVE WILL RESIDE

Examine your computer system to select a "home" for the new drive. If you have only a single half-height bay available, don't consider purchasing a full-height drive, since it won't fit. If you have only half-height 5¼-inch wide bays available and you're going to purchase a 3½-inch wide hard drive, you'll also need a mounting kit to secure it in the wider bay. If you're considering a hard card, you'll need at least one full-length expansion slot available to accommodate it. Knowing what your present configuration is and what resources are available in your system will aid you in making an intelligent hard drive purchase decision.

—TOM BENFORD

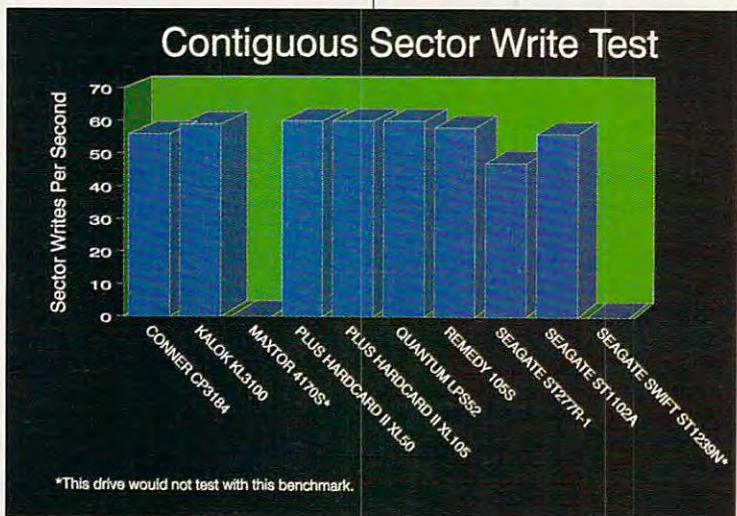
SEAGATE ST1102A

This half-height Seagate drive arrived completely formatted with the MS-DOS 5.0 operating system and a CONFIG.SYS file already installed—a pleasant surprise, indeed.

Along with the drive, Harmony Computers supplied the appropriate IDE ribbon cables and a half-slot IDE hard/floppy controller card. All I needed to come up with was a mounting kit to secure the 3½-inch unit into an available 5¼-inch bay in my test system.

The physical installation of the drive went along without a hitch, requiring less than 15 minutes to secure the drive in a bay and attach the cables to the controller card. Next on the to-do list was selecting the appropriate drive type from the PC's CMOS setup list, and here's where things got a bit interesting.

In addition to the Seagate installation guide booklet supplied with the drive, Harmony provided a "drive geometry" printout, which gave specific data about this particular drive. Included were its serial number, ROM/RAM versions, date and time stamp, and the physical configuration, which was listed as "Cyls: 1021 - Heads: 5 - Sectors/Track: 44, 36, 30 - Bytes/Sector: 512." On the surface this appears to be



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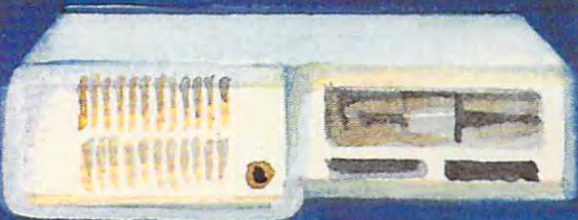
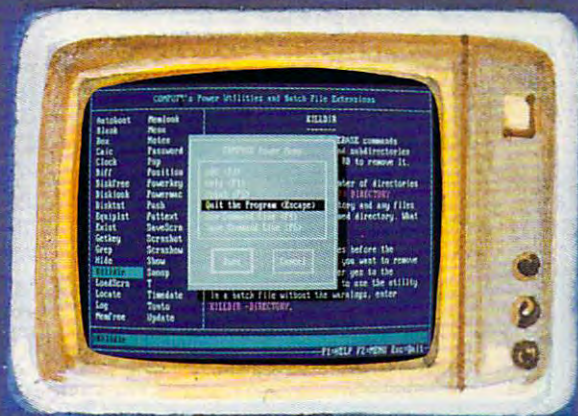
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TIP 4: CHECK COMPATIBILITY

When ordering a new drive, be sure to tell the salesperson what kind of hard drive and controller you have in your system currently and ask if the new drive will be compatible with these components. If the salesperson doesn't know, ask to speak with someone in tech support to get the answer. If you're told that you'll need a new controller card, ask if your old drive will work with the new controller card. Most importantly, ask what the return policy is if the new drive or controller doesn't work with your current setup.

TIP 5: ASK WHAT'S INCLUDED

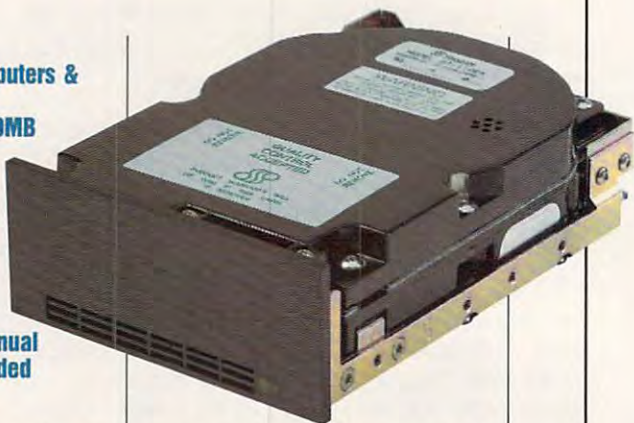
In addition to the drive itself, you'll also need a connecting cable or cables, a mounting kit, and, depending on which version of DOS you're running, partitioning software. You may also require a new controller card and appropriate cables to connect your old drive to the new card. Be sure to inquire what is included with the drive and what will have to be purchased at additional cost. Knowing your system configuration will help in determining what mounting hardware, cables, and software you'll need.

TIP 6: CHECK ON AVAILABLE ASSISTANCE

Be sure help will be available if needed. Depending on your current system components, the drive type and model you purchase, and your own technical acumen, installing a hard disk may be more than you can handle by yourself, and it's good to know that competent technical support is only a phone call away. Be sure to ask about tech support from the vendor you call to establish whether a technician will be available to answer your installation questions or you'll have to call the drive/interface manufacturer. If you think you'll be in over your head, you might be better off purchasing the hard drive from a local computer store/dealer and having the installation done there. Don't expect to get tech support from a local dealer for a drive you purchased via mail order!

—TOM BENFORD

SEAGATE ST1102A
Supplier: Harmony Computers & Electronics
Price: \$309 Capacity: 80MB
Controller/Interface: 16-bit IDE hard/floppy controller card
Condition as Received: preformatted, DOS 5.0 and CONFIG.SYS file preinstalled on drive, Seagate installation manual and ribbon cables included



helpful information that is essential in selecting an appropriate drive type from the CMOS menu. However, in the Seagate installation guide I found other specs conflicting with this shipment document.

On page 10 of the manual, a table advises that Drive Type 35 should be selected for machines running an AMI BIOS dated April 9, 1990, or later (as on our test system); the setup for Type 35 automatically comes up with 1024 cylinders, nine heads, 17 sectors, and 77MB capacity—all quite different from the enclosed geometry document. But that's not all. The upper half of page 11 in the Seagate manual states that Drive Type 35 should come up with 80.2MB capacity. It gets even more interesting on the bottom half of page 11, which advises, "If you have a system BIOS which offers a user-defined drive type [as mine does], select from the following drive configurations: For an ST1102A drive—1024 cylinders, ten R/W heads, 17 sectors/track, 89.1MB formatted capacity."

It all sounded pretty confusing to me. Which specs should I use for the CMOS setup? Fortunately, I have another PC in the lab which also runs a late-model AMI BIOS, and it's also equipped with a Seagate ST1102A drive. I took a look at the CMOS setup on that machine and saw that it was User-Defined Type 47 (1024, 10, 1025, 17, 85MB), so that's the one I used for our review unit as well.

All of this conflicting information was confusing, indeed! Just to be

on the safe side, I placed a tech support call to Harmony Computers, and the technician immediately told me to select User-Defined Type 47 and set it up for 1024 cylinders, ten heads, 17 sectors, and a 1025 compression setting (an exact match of our choices). He even provided Seagate's 800 number in case I needed any additional help. Hats off to Harmony's tech support staff!

After I exited the CMOS setup, my test PC rebooted directly from the Seagate drive, and I proceeded to run some tests. One thing that really perplexed me was *SpinRite II*'s inability to determine the seek time of this disk. A message displayed said, "This computer's hard disk subsystem is ignoring cylinder seek commands." I changed the operating system to MS-DOS 4.01 in an effort to get a seek reading but to no avail. I then tried to reconfigure the drive in CMOS to a different drive type as suggested in the Seagate Hard Drive installation manual, but this didn't alleviate the problem either. As a last resort, I tried running the *SpinRite II* test on our other similarly configured PC, but the same message appeared on this machine as well. Apparently some sort of incompatibility exists between *SpinRite II* and the ST1102A drive, at least when it comes to taking seek-timing measurements.

I didn't have any problems getting performance measurements with COMPUTE's proprietary benchmark software or with *Nor-*

ton Utilities 5.0, so I went with these figures and proceeded to load files on the drive and put some miles on it. The drive is a quick and reliable performer that packs 80MB of storage into a small, fast package.

TOM BENFORD

Circle Reader Service Number 309

SEAGATE SWIFT ST1239N

The 203MB Swift ST1239N drive is a testament to Seagate's commitment to performance and quality, as evidenced by the unit's quiet operation and 15-ms average seek time.

The installation of the drive couldn't be simpler. You'll need a SCSI interface card and a 50-pin ribbon cable, which were not supplied with the drive. The interface card plugged into an expansion slot, and I installed the tiny drive in an open 5¼-inch half-height bay using mounting brackets. Once I'd connected the power cable to the rear of the drive, the majority of the work was done. The drive comes low-level formatted to 203MB, so all you need to do is partition the disk and create logical drives with MS-DOS's FDISK utility (not supplied with the drive).

After completing the installation, I had a 160MB partition and a 43MB partition, designated as drives E: and F: (the resident 40MB drive on my computer system already had C: and D: designations). After some of the installation enigmas I have experienced with other drives, you can't imagine my relief at the ease with which this drive installed, especially since it had no problems getting along with the resident 40MB drive in the system. The Seagate manual is packed to the brim with all the information needed for a successful installation and includes illustrations of the process to supplement the descriptive text.

Once running, the drive per-

SEAGATE SWIFT ST1239N

Supplier: Corporate Systems Center

Price: \$595

Capacity: 207MB

Controller/Interface: SCSI

Condition as Received: low-level formatted, no DOS



formed exactly as expected: quietly, with speed and reliability. Its diminutive size certainly posed no problems in any performance-related areas. Supported by both Computer Systems Center and Seagate itself, technical assistance is not lacking for this drive, although I didn't require any tech support. Far too often you can find yourself on the short end of the stick when dealing with mail-order and discount companies offering amazing deals. The

Seagate Swift ST1239N is an excellent choice, and dealing with CSC is a pleasant experience.

SCOTT MEGILL

Circle Reader Service Number 310

For further information about this month's Test Lab, see the COMPUTE area on GENie and America Online. In addition to regular Test Lab information, you'll find our HDBENCH.EXE, proprietary benchmark software developed especially for the Test Lab.

HARD DRIVE INTERFACE TYPES

MFM: Modified Frequency Modulation is the oldest of the six interface types. It's typically the slowest and least expensive of the bunch, operating at a transfer rate of about five megabits per second (Mbps). It transfers data more slowly than other technologies principally because it allows only 17 sectors of data per track.

RLL: Run Length Limited permits a higher number of sectors per track (26), increasing transfer rates to 7.5 Mbps. The main drawback to RLL is the increase in price. The storage medium (hard drive disk) must be a stronger type to handle the increased demands on the magnetic surfaces.

ARLL: Advanced Run Length Limited, sometimes also known as ERLL (Enhanced RLL), compresses data even more tightly on the surface of the hard disk to gain about 75 percent more capacity and speed than that of a standard MFM controller and about 25 percent more than that of an RLL card—approximately 9.3 Mbps. As is usually the case, these enhancements mean higher prices.

ESDI: Enhanced Small Device Interface requires that its hard

disks are specifically manufactured to run ESDI, which tends to drive up prices. However, the interface runs at 10 Mbps and supports 34 sectors per track, which makes large capacity drives run at speeds often exceeding the speeds of smaller units using other interface types.

SCSI: Small Computer System Interface has been around awhile but has only recently become popular as a hard drive interface. SCSI's real claim to fame is its ability to control up to seven devices on the same controller board. Coupled with a 32-Mbps transfer rate, SCSI controllers have found quite a large following and are assured a steady future.

IDE: Integrated Drive Electronics, the newest interface type to appear, sports extremely rapid transfer rates and is typically capable of sending 16 bits of data at a time. IDE has a theoretical speed of about 12 times faster than a standard MFM interface, but its price is also elevated. IDE may pose compatibility problems when installed in systems with existing non-IDE controllers.

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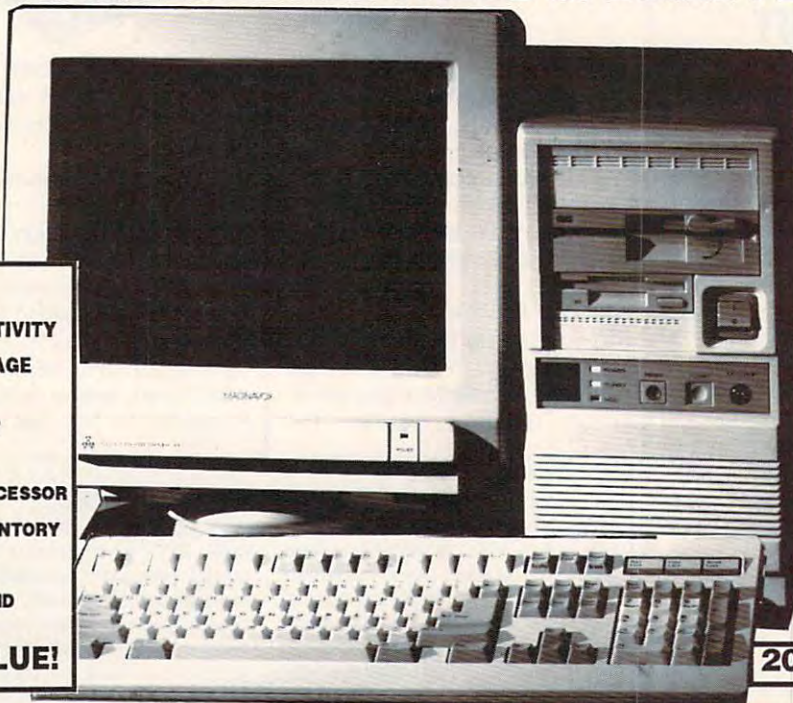
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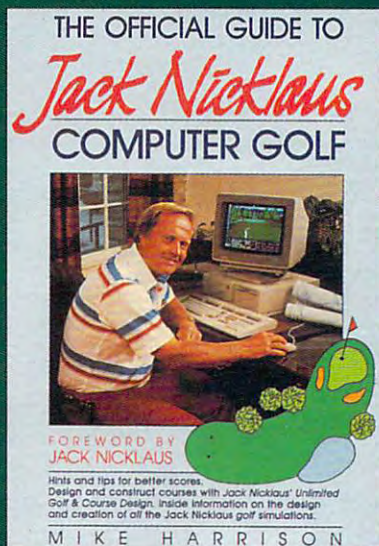


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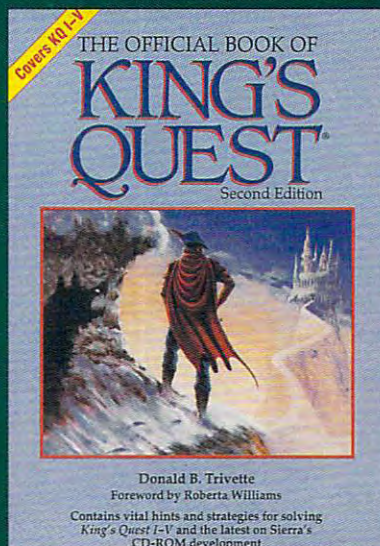


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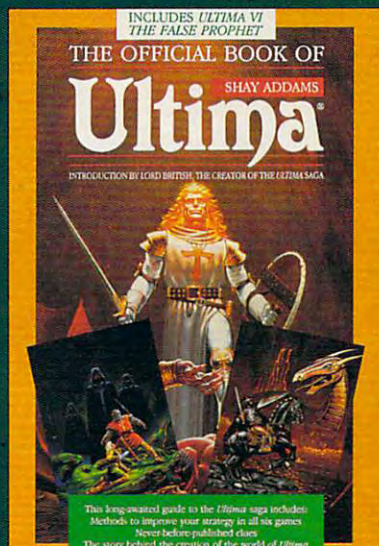
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TELECOMMUNICATIONS POWER

TONY ROBERTS

Wake up, telecommunicators! You're working too hard. The rest of the world has moved up to automated telecommunications while you're still waiting for prompts and typing account numbers and passwords.

If you telecommunicate, it's time you looked into ways to automate the process, and there are several reasons why:

- You can save time.
- You can save money.
- You can have fun programming your PC.

If telecommunications is part of your business, you know that saving time is essential. The sluggish economy, business downsizing, and increasing competition force every worker to find ways to be more productive. If you can find ways to increase what you can do in a day, you'll protect your job and build skills for your career.

Whether you're a business or home telecommunicator, saving money is always an issue. Automated telecommunications allows you to accomplish more in less online time, keeping both online charges and telephone line charges down.

Ten years ago, computer programming—mostly in BASIC—was a part of every computer user's day. You needed a little programming here and there just to keep your system going. Programming became a challenging hobby enjoyed by thousands of computer owners who were able to use their newly learned skills to create useful software for their families and businesses.

The evolution of computing, however, has left would-be recreational programmers twiddling their thumbs. Systems have become so complex and software has become so advanced that it's almost impossible for the average person to write application software that's really useful or

that can compete with today's off-the-shelf programs.

Unless you're going to throw your life into it, it's difficult to justify the expense of a software development package and all the tools and research materials that go with it.

If you own a telecommunications program, however, you probably have the tools at hand to embark on some small programming projects that have a purpose. You can use your program's script language to create custom software that's useful for you, and in so doing, you can save time and money and complete a challenge.

If you're not up to programming, don't desert me. It's possible to automate telecommunications sessions in other ways, including the use of keyboard macros and dedicated front-end software programs. In fact, serious telecommunicators will probably adopt a combination of these methods. See "No Programming Required" for more information on these nonprogramming alternatives.

An Elementary Guide to Script Writing

Every telecommunications program has its own script language, but most telecommunicators take one look at the script language manual and stop cold.

Even some *programmers* are put off by 200 pages of cryptic commands. Don't lose your cool. Getting started is easier than it looks.

Although these script languages have the raw power to produce huge and complex programs, most home-hacker telecommunications chores can be accomplished with a handful of commands.

If you can figure out how to do the following four things, you can write telecommunications scripts.

- Dial a telephone number.
- Watch for specific information coming in over the modem.
- Send and receive characters.
- Send and receive files.

This article will show you how to accomplish these tasks using the script languages provided with *Procomm Plus* and *Telix*, two popular telecommunications programs. Even if you have a different package, follow along, because chances are that the commands your program offers are similar.

Both *Procomm Plus* and *Telix* include sample script files on their distribution disks. If you have *Procomm Plus*, look for files with ASP extensions; if you have *Telix*, look for files with SLT extensions. The rationale for these ex-

tensions crystallizes when you realize that *Procomm Plus* scripts are created with the *Aspect* language, and *Telix* scripts are created with a language called *SALT*.

These sample files are excellent references for command usage. In fact, some of these programs can be put right to work. Both programs offer a script that logs on to CompuServe once you fill in your account number and password. That script can then be modified to work with other services you call.

Programming Prologue

- Both *Aspect* and *SALT* are C-like languages. If you don't know C, don't worry, the scripts you write as a beginner will consist of a start and a finish with a few program lines in between.
- Both script languages allow you to use variables and require that they be defined before they are used. However, many simple scripts, including the ones used here as examples, can be written without variables.
- Finally, most of the commands available in script languages have far more options than the beginning programmer can use. Many commands also provide a return value. This is a code that your program can use to verify that the previous command was successful. Return values are crucial in complex programs that run unattended, but simple programs that are built to save you tedious repetitive keystrokes usually can do without them.

Dialing

Both *Procomm* and *Telix* can associate scripts with dialing directory entries. That is, you select an entry from the dialing directory; the program dials and establishes a connection. Once the handshake occurs, the script kicks in.

However, sometimes it's convenient to include dialing commands in your script. This might allow you to execute your scripts from DOS or from another program such as *dBASE*.

Basic Script Commands

Command	Telix	Procomm
Dial a number	DIAL	DIAL or MDIAL
Wait for text	WAITFOR	WAITFOR
Send characters	CPUTS	TRANSMIT
Manipulate buffer	CAPTURE	LOG
Download file	RECEIVE	GETFILE
Upload file	SEND	SENDFILE

NOTE: In the syntax examples for the Procomm Plus telecommunications commands, some parameters are separated by the vertical bar symbol, represented by the character |. This symbol should be interpreted as "or," and only one parameter should be used at a time.

In the *Telix* examples, command parameters are placed in parentheses and are separated by commas. The examples also indicate what kind of parameter is required—*str* indicates a character string parameter, and *int* indicates an integer. All *Telix* statements must conclude with a semicolon.

Dial a Number

Procomm:

```
DIAL "[[ldcode]entry[[ldcode]]..."  
      strvar[stringvar]
```

or

```
MDIAL "[[ldcode]number[[ldcode]]"  
       strvar[message]
```

Telix:

```
DIAL (str<dialstr>, int<maxtries>,  
      int<no_link>);
```

Procomm Plus uses separate commands to handle numbers selected from the dialing directory and manually entered numbers. *DIAL* plucks a number from the dialing directory and initiates the call. If you want to call the service that's listed fifth in your dialing directory, *DIAL 5* will do the trick. If special long distance codes need to be added to the number, they can be appended before or after the dialing directory number as appropriate.

Manually dialed numbers are simply entered with the *MDIAL* command as in *MDIAL 555-1212*.

Although it may seem easier to select manual dialing for many simple scripts, there's an advantage to using the dialing directory. The dialing directory entries contain the settings for each service you call. By using the dialing directory, you ensure that your telecommunications parameters will be correct. Under manual dialing, however, the program establishes a connection using whatever settings and parameters are currently in effect.

In *Telix*, one command does all the work. In its simplest form, you enter the dialing directory entry number for the service you want to call, such as *DIAL("5")*. Other parameters you can add indicate the number of times *Telix* should attempt to establish a connection and a code to deactivate a script that's associated with the dialing directory entry.

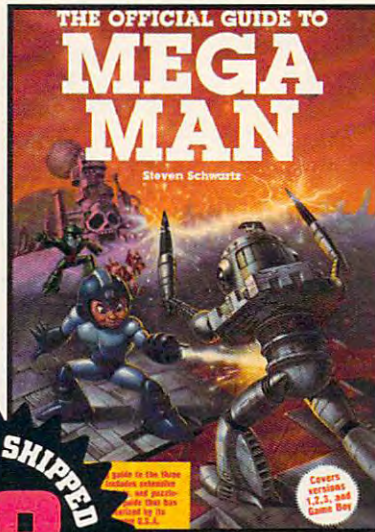
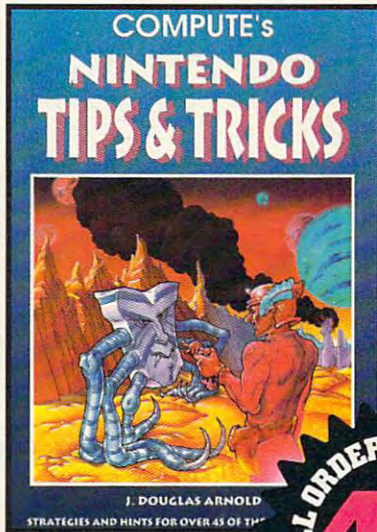
The command *DIAL("4", 10, 1)*; would dial entry number 4, try ten times to make a connection, and not run the script file associated with the dialing directory entry. If the second parameter, *maxtries*, is 0, *DIAL* will attempt to make a connection until it is either successful or halted by the user. If the no-link parameter is either not included or set to 0, the script associated with the dialing directory entry will

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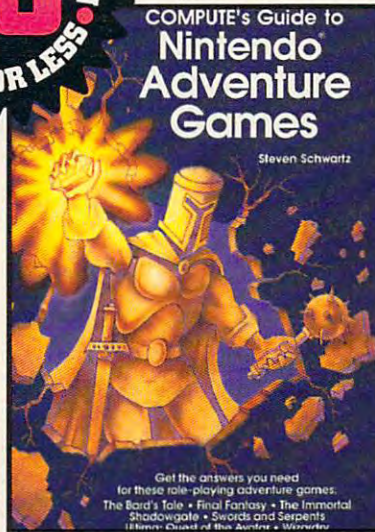
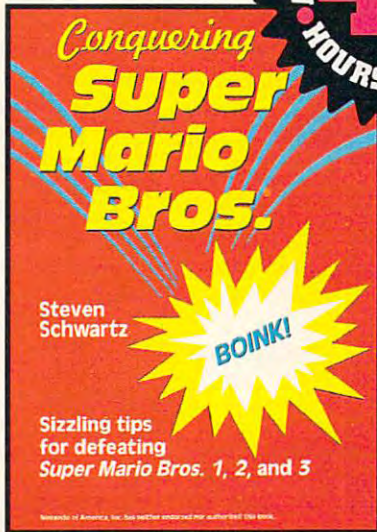
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SAMPLE SCRIPTS

```
PROGRAM 1: Procomm Plus Aspect Script
;* Procomm Plus script to log on to local BBS
;* and capture all mail into default log file.
;*
PROC MAIN
;* Call entry number 1 in dialing directory and log on at prompts
DIAL "1"
WAITFOR "First Name:" 15
TRANSMIT "Tony"
TRANSMIT "^M"
WAITFOR "Last Name:" 15
TRANSMIT "Roberts"
TRANSMIT "^M"
WAITFOR "(Y/N)?" 15
TRANSMIT "Y"
TRANSMIT "^M"
WAITFOR "Password:" 15
TRANSMIT "password"
TRANSMIT "^M"
;* open log file to capture mail
LOG OPEN
;* wait for prompt from menu and issue series of commands to read mail
WAITFOR "Choice?" 15
TRANSMIT "R"
WAITFOR "?" 15
TRANSMIT "F"
WAITFOR "first"
TRANSMIT "^M"
WAITFOR " ?" 15
TRANSMIT "C"
;* wait for return to main menu, close log file, and log off BBS
WAITFOR "Choice?" FOREVER
LOG CLOSE
TRANSMIT "G"
ENDPROC

PROGRAM 2: Telix SALT Script
// Telix script to log on to BBS at typesetting service.
// This script logs me on to the BBS, then goes through
// the steps necessary to upload a file called ROBERTS.ZIP.
MAIN()
{
// dial a number manually rather than use dialing directory
DIAL ("m274-8131");
WAITFOR ("First Name:",15);
CPUTS ("Tony");
CPUTS ("^M");
WAITFOR ("Last Name:",15);
CPUTS ("Roberts");
CPUTS ("^M");
WAITFOR ("(Y/N)?",15);
CPUTS ("Y");
CPUTS ("^M");
WAITFOR ("Password:",15);
CPUTS ("password");
CPUTS ("^M");
WAITFOR ("Choice?",15);
// select menu option to upload file
CPUTS ("U");
WAITFOR ("Your choice?",15);
// specify ZMODEM protocol
CPUTS ("Z");
WAITFOR ("Filename?",15);
CPUTS ("ROBERTS.ZIP^M");
WAITFOR ("Description:",15);
CPUTS ("File for Typesetting from T. Roberts^M");
WAITFOR ("CTRL-X aborts",15);
send ("Z","ROBERTS.ZIP");
WAITFOR ("Choice?",15);
// choose Good-bye from menu
CPUTS ("G");
CPUTS ("^M");
}
```

be activated once the connection is established.

If you don't want to use the dialing directory in *Telix*, precede the phone number with the letter *m* to indicate manual dialing: `DIAL("m555-1234");`

Wait for Text

Procomm:

```
WAITFOR string [integerFOREVER]
```

Telix:

```
WAITFOR(str<waitstr>,int<timeout>);
```

The `WAITFOR` command is central to any telecommunications script. Its function is to keep watch for a specific string of characters that the program needs in order to take its next steps. For example, `WAITFOR "Password:" 60` in *Procomm Plus* or `WAITFOR("Password:",60);` in *Telix*

causes the program to monitor the communications port for 60 seconds, looking for the password prompt. As soon as the string "Password:" comes in or as soon as 60 seconds go by, the program will move on to the next command.

Setting the timeout parameter to 0 in *Telix* or to `FOREVER` in *Procomm Plus* prohibits the script from advancing unless the proper string is received.

Send Characters

Procomm:

```
TRANSMIT string
```

Telix:

```
CPUTS(str<outstr>);
```

You'll use these commands to send data, such as your account number, password, and menu selections to the communications port. These commands

will usually follow a `WAITFOR` command.

Assuming your password is "secret*word", you can transmit it in *Procomm* using the command `TRANSMIT "secret*word"`. In *Telix*, the command would be `CPUTS("secret*word");`

Note that neither language automatically adds a carriage return, so you'll have to do it yourself, either by appending the carriage return code (^M) to the password string or by sending a second command as in `TRANSMIT "^M" or CPUTS("^M")`.

This carriage return code is entered by typing the carat (Shift-6 on most keyboards) and then an uppercase *M*. This combination is interpreted by the program as Control-M, which is equivalent to ASCII 13, the carriage return character.

This same process can be used to send other control codes such as ^G, the bell character, or ^J, the linefeed character.

Manipulate Buffer

Procomm:

```
LOG [OPEN [filespec]
CLOSESUSPENDRESUME]
```

Telix:

```
CAPTURE(str<filename>;
```

In many instances, you'll want to capture some information while you're online. The `LOG` and `CAPTURE` commands can be used to grab an image of the telecommunications session, or parts of it, and save it to disk as an ASCII file that can be examined later.

Both *Procomm Plus* and *Telix* allow you to specify default filenames for this process in their setup utilities. Unless you override those filenames in your script, the captured data will be appended to those files.

In *Procomm Plus*, use commands such as `LOG OPEN`, `LOG CLOSE`, `LOG SUSPEND`, and `LOG RESUME` to control the current log file. The command `LOG OPEN "data.txt"` would open a new log file, `DATA.TXT`.

The *Telix* syntax for this function is similar: `CAPTURE("data.txt")` opens the file `DATA.TXT` and saves the current telecommunications activity in it. Further buffer manipulation is accomplished with the following commands:

```
CAPTURE("***CLOSE**");
CAPTURE("***PAUSE**");
CAPTURE("***UNPAUSE**");
```

If you use a null string ("") in your capture command, as in `CAPTURE("")`, *Telix* opens a dialog box allowing you either to select a file to open or to close or pause a currently open file.

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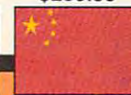
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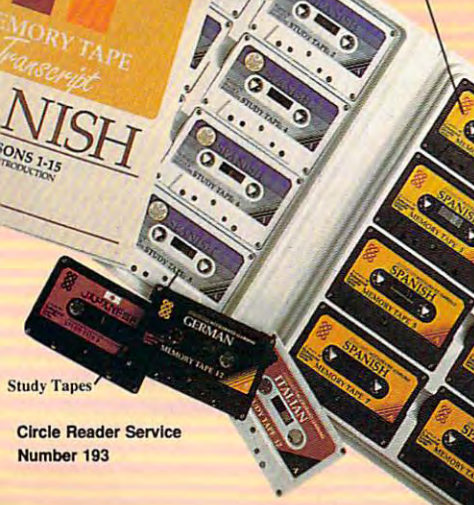
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Key Macros

By assigning frequently used commands—log-on sequences, E-mail retrieval commands, passwords, and so on—to macro keys, you can have one or two keystrokes do the work of many. Not only will you eliminate mistyped commands, you'll streamline your telecommunications sessions and save time and money.

Terminal, the Windows 3.0 telecommunications program, for example, allows you to store frequently used strings on function keys or buttons that you can click with a mouse.

These definitions are retained with each setup you save, so if you call two or three online services or bulletin boards, you can partially automate your telecommunications processes by building a consistent set of macros.

For example, in each setup, place your log-on string (account number, password) on key 1 or button 1 and place the log-off command on key 10 or button 10. If you use other commands, place them similarly in each setup.

Once that's done, you won't have to struggle to recall the syntax for each service; if you're logging on, use key 1, and that's all there is to that.

Front-End Software

Dedicated front-end software programs are designed to work with a specific telecommunications service, such as GENie, CompuServe, or Prodigy. These programs are structured to minimize online time by allowing you to read data and select information for downloading while offline and to navigate more quickly while online.

If you plan to be a regular user of these services, it pays to investigate these front ends since they're optimized to work with each service. With GENie's *Aladdin*, for example, you do most of your work offline—reading messages, composing mail, selecting files to download. Once everything is prepared, press a key, and *Aladdin* logs on, delivers your mail, downloads selected files, performs any other tasks you've queued up, and then logs off as quickly as possible.

CompuServe's *CompuServe Information Manager* is a shell that allows you to move about the massive system faster and more efficiently. By using *CIM*, you can retrieve mail and move to your favorite areas with a single menu selection. Discussion topics and files to download can be marked and retrieved for offline perusal in batches rather than one at a time.

script that dials a service, logs you on, and then turns control over to you. This type of script saves you the trouble of remembering and repeatedly re-typing account codes and passwords.

Once you have your log-on script built, you can enhance it to gather your mail, fetch stock quotes, or take you directly to a favorite round table where a lively discussion is going on.

To help you create these scripts, turn on your system's CAPTURE or LOG file as you go about your normal telecommunications business. After you log off, print out the file, and you'll have a record of all the prompts you encountered and all the commands you issued in your online travels. Then program those steps into your script and let your program, rather than your fingers, do the walking.

Rest assured, though, that it's not as simple as all that. As you know, different situations pop up when you're online. For example, when you're reading your mail, what prompts do you encounter if you have no mail, have one letter, or have several letters? To build a successful script, you have to anticipate all the possible situations and create a branch in your script for each.

The sample scripts included with this article are simple linear scripts. They start at the top and go step-by-step to the bottom. If problems are encountered along the way, these scripts have no way of recovering. They'll either just sit and wait, not knowing what to do, or rush ahead supplying the wrong commands at the wrong prompts. Nevertheless, these scripts can serve to automate the most repetitive of your telecommunications chores.

After you come to understand the simple commands outlined in this article, however, you can begin to tap the dozens of other commands and functions provided in the script languages. For example, you'll want to begin to test result codes after various operations, such as uploading or downloading a file. By testing the result code, your program will know if the transfer succeeded, and based on that information, the script can either go on to the next step or branch to a routine designed to correct a problem.

For those not familiar with programming, *Aspect* and *SALT* scripts are built by combining a series of procedures. In the examples provided here only one procedure, *main*, is used.

Procomm Plus requires you to declare the procedure with the command PROC MAIN and end it with the command ENDPROC. *Telix* declares the procedure with the command MAIN and then encloses the commands in that

Download and Upload Files

Procomm:

```
GETFILE protocol [filespec]
```

Telix:

```
RECEIVE(int<protocol>,str<name>);
```

Procomm:

```
SENDFILE protocol filespec
```

Telix:

```
SEND(int<protocol>,str<name>);
```

Activating a telecommunications program's file transfer utility is fairly simple. You enter the send or receive commands followed by parameters specifying a transfer protocol and a filename. *Procomm Plus* uses full words to specify protocols, as in GETFILE ZMODEM "myfile.txt", while *Telix* expects the protocol parameter to be a one-letter code as in SEND('Z',"myfile.txt").

These commands are only the final step in an automated file transfer. First, you must make sure you've navigated the host system's menus properly to get you to the right spot and that you've supplied the host with a valid filename for its purposes. Then, only after the host is ready to begin the transfer, your script issues the GETFILE or SENDFILE command.

Uploading and downloading from script files is usually best suited for specific cases in which the same filename

can be used repeatedly.

For example, at COMPUTE, orders for disk products are entered into a dBASE database application as they are received. Periodically, a program is run that organizes all pending orders, copies the order information to a separate file, shells to DOS, and activates a telecommunications script that transfers the order files to another location where the disks are packed and mailed.

Depending on the number of orders to process, this series of steps can take an hour or two, so the automation pays dividends by allowing the operator to go off and complete other tasks or even go out for lunch.

In my desktop publishing business, I use a version of the sample *Telix* script to upload files to a typesetter for high-resolution output. The hard-coded filenames work because I always group my files and a READ.ME file with instructions for the typesetter into a zipped archive with the name ROBERTS.ZIP. I can start the script file and go off to a meeting with a client knowing that the script will keep dialing until the typesetter's constantly busy modem is able to answer and my file is transmitted.

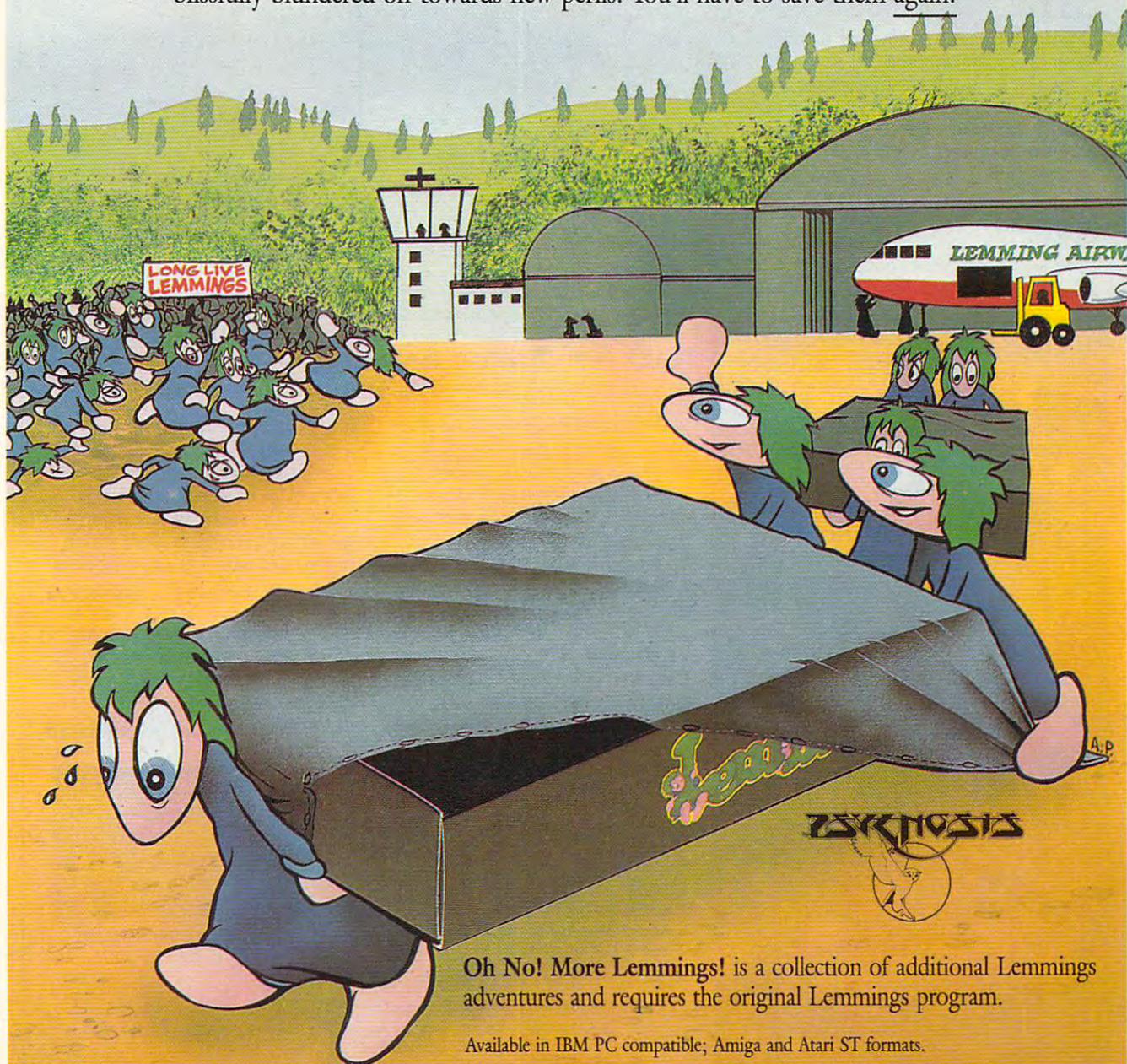
Strategies for Successful Script Design

One of the easiest scripts to design, and one of the most useful, is a simple

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procedure in curly braces ({}). *Telix* also requires that each program statement end with a semicolon. Subprocedures can be developed that are called from the main command.

Although not discussed in this article, both languages allow the use of variables, and both require that the variables be declared, or initialized, prior to use. Study the sample scripts provided with your telecommunications software to see how variables can be used as counters, to store account numbers and passwords, to hold filenames, and much more.

Before a script can be used, the source code must be compiled. Compiling turns program code that you can read into more compact instructions that the computer understands. If you make changes in your script, you'll have to recompile it before the changes take effect.

Procomm Plus will attempt to compile and run an uncompiled script on the fly, but if it's unable to compile the script successfully, *Procomm Plus* doesn't provide much information about the problem.

It's usually better to compile your scripts from the DOS prompt using the command `ASCOMP scriptname` from *Procomm Plus*, or `CS scriptname` from *Telix*. If errors are encountered, the com-

piler will give you some information about the error and tell you on what line of the script the problem occurred. Then you can go about making the correction and recompiling the script.

Compiled scripts have the same root filename as the original script, but the extension is different. In *Procomm Plus*, compiled scripts bear the extension `ASX`, and in *Telix*, compiled scripts are identified by the `SLC` extension. Once your script is working properly, you can remove the original source code from the system because it's the compiled version that does all the work. However, be certain to keep a copy of the original on hand in case you need to make modifications. Compiled scripts cannot be reedited.

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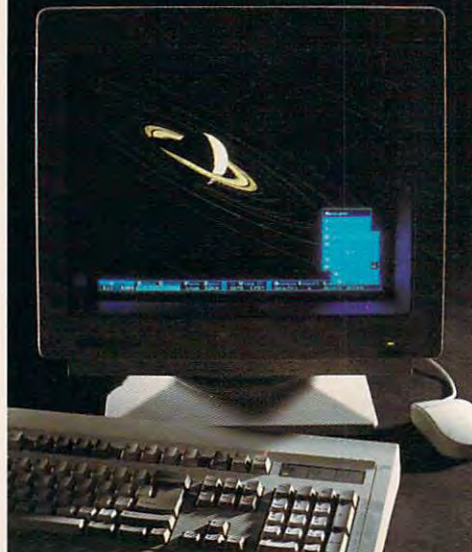
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TELECOMMUNICATIONS ON THE GO

Macros and scripts aren't the only path to quick and easy telecommunications. Sometimes a portable modem is what you need. But you can't plug a pay phone cord into a modem jack. I discovered that painful fact one afternoon when I pounded a city's sidewalks for an hour in search of a telephone cord that could be used with my laptop's modem. I never found a direct-line phone connection.

If you have to telecommunicate when you're on the road, you'll truly appreciate the acoustic interface supplied with Com 1's Le Voyager MV 214 modem. Although the model I tested can use a direct-line phone connection (if you can find a compatible jack), the modem works best using a simple acoustic coupler that straps directly to the telephone handset. And unlike earlier generations of acoustic couplers that worked well only on telephones with rounded ear- and mouthpieces, Le Voyager MV 214's coupler swivels and slides to adapt to handsets that are flat, round, or almost any other shape.

The modem itself is a small rectangular box about the size of a deck of cards. Powered by either a nine-volt battery or an optional transformer, it connects to your computer's serial port with a 25-pin cable (purchased separately). There is no power switch; Le Voyager comes on when you access it through your communications soft-

ware. Compact and powerful (transmitting at 2400 bps normally and 4800 bps or higher using the MNP5 protocols, if you're communicating with a similarly equipped modem), Le Voyager offers business travelers, laptop users, and other mobile telecommunicators an efficient way to send and receive information.

The user handbook is concise and helpful despite its lack of an index and a troubleshooting section. Although it has its positive points, I did discover an anomaly in the handbook. It includes instructions for autodialing while using the acoustic coupler, but it's impossible to autodial with the acoustic coupler.

It's unfortunate that you have to dial manually while using the coupler, particularly if you are using a telephone that dials from the handset; the coupler gets in the way of the keypad.

At first, I had trouble using Le Voyager. My initial connections were plagued by scrolling screens of garbage, but Com 1's helpful telephone support crew came to the rescue. I was able to eliminate the problem by using the JCL command, which lowers the modem's sensitivity to phone line noise.

I tested Le Voyager by transmitting the same file several times at different noise levels from the desktop PC in my home office. The modem had no trouble transmitting

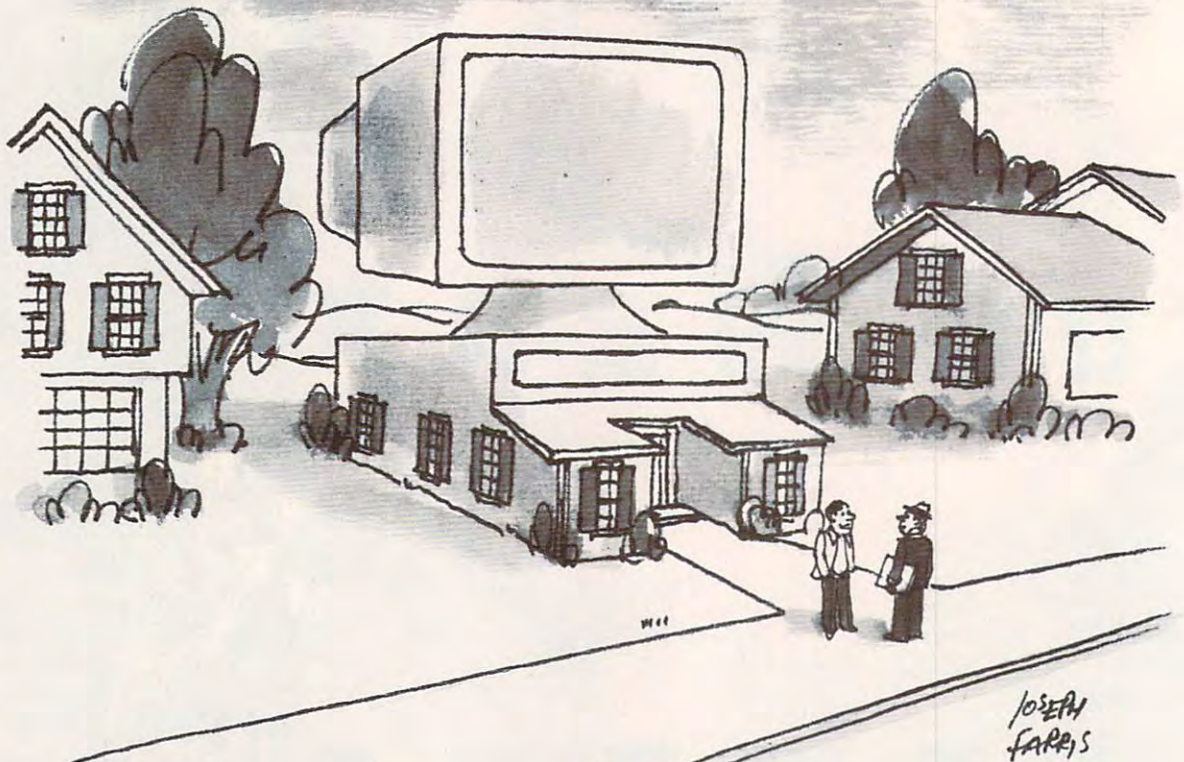
clean copy through such routine noises as a stereo and a window-unit air conditioner, but my files quickly became cluttered with garbage when I transmitted while my wife and I shouted at each other and banged on the filing cabinets. The logical next step was to take Le Voyager out into the field. The first try would be from an outdoor phone at an auto racetrack, followed by an attempt from the lobby of an arena where a rock concert was taking place, with the final test from an outdoor phone at Cape Canaveral during a space shuttle launch. Since the results of the tests in my home office seemed conclusive, however, I decided that field tests would be redundant.

Actually, under average conditions, the modem appeared to have no trouble providing error-free transmissions to a variety of systems over a reasonable level of external sound. As long as you avoid loud, sharp noises during transmission, Le Voyager MV 214 provides flexible telecommunications power in a small package.

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TIPS & TOOLS

Check Out a Directory

I recently discovered that CHKDSK can check individual directories for noncontiguous files. Noncontiguous files aren't contained in a single block of data on a disk but are scattered among the data clusters. These files are slower to load and slower to write to. There are plenty of commercial programs that shuffle the data to make it contiguous, but this technique gives you an idea of your situation without a disk optimization program.

Simply type CHKDSK *.* and the files in the current directory will be checked. You can also type CHKDSK C:\DOS*. * for a directory other than the current directory. You can also set the file mask to include only the file type you want to check by typing an extension, as in CHKDSK *.EXE.

What you'll see is a report on any files that have noncontiguous blocks and how many of these noncontiguous blocks they contain. If you've noticed a slowdown in drive access speed and you find a large number of noncontiguous blocks, you might consider using a disk optimizer to increase disk performance.

SHANE DEVENSHIRE
WALNUT CREEK, CA

Near Letter Quality

I do a lot of printing from the DOS prompt. Most of the files I output are pure ASCII files. Sometimes I find it necessary to print files in near letter quality. I've found a method of setting the NLQ mode without loading a word processor or flipping switches. I created a utility with DEBUG that allows me to do this.

Make sure the DOS program called DEBUG is in your path or the current directory. In this example, the italic text is what the computer

prints; the roman text is what you should type. The hatch marks (####) represent the four-digit segment number, which will vary.

DEBUG NLQ.COM

File not found

-A 100

####:0100 MOV AX,001B

####:0103 XOR DX,DX

####:0105 INT 17

####:0107 INT 20

####:0109

-RCX

CX 0000

:E

-W

Writing 000E bytes

-Q

Make sure your printer is on. This utility does no error checking. Now, from DOS, type NLQ and press Enter. Now you can copy files to PRN or use the DOS TYPE command and redirect to PRN, and the output will be in near letter quality.

THOMAS E. HINES III
CLARKSVILLE, TN

Reflective Computing

Here's a tip for people who constantly twist their necks to see who's walked into the room while they're working on their computers.

Go to the nearest auto store and buy a spot mirror. They come in round or rectangular shapes, cost under \$2, and give a wide-angle view of traffic. Attach one to the computer with the supplied adhesive. Then, when someone walks into your office, you can quickly glance at the mirror and know who it is. It's great for added security and saves on the neck twisting.

NEIL SCOTT
FINDLAY, OH

Easier PC Shell

While it's not obvious in the documentation, there's a method of dragging a mouse to se-

lect or deselect files with Central Point's PC Shell. Hold down the right mouse button with the cursor over the name of one of the files to be selected. Press and hold the left button and drag the cursor over the names of the files to be selected. All the filenames touched by the cursor will be selected (or deselected if the cursor was over an already selected file when the left button was originally pressed).

This can be used when certain files in a line or within a rectangular region are to be selected without specifying a common file extension with the Select command.

BEN SEREBRIN
LAKELAND, FL

Just the Dirs, Ma'am

If you want to use the DOS DIR command to see a list of directories, you're out of luck. You can create a special program, though, that does just this. It's called DIRDIR, and it displays subdirectories located in the current directory.

Make sure the DOS program called DEBUG is in your path. In this example, the italic text is what the computer prints; the roman text is what you should type.

DEBUG DIRDIR.COM

File not found

-E 100 B4 4E B9 10 00 BA

39 01 CD 21 72 29

BA 9E 00 BE

-E 110 95 00 F6 04 10 74

18 2A C0 8B FA B1

0F F2 AE 4F

-E 120 C6 05 0D C6 45 01

0A C6 45 02 24 B4

09 CD 21 B4

-E 130 4F CD 21 73 DD

B4 4C CD 21 2A

2E 2A 00

-RCX

CX 0000

:3D

-W

Writing 003D bytes

-Q

Checking the spelling of a single word in WordPerfect, a directory listing—of directories, controlling your printer from machine language, and more

After creating this program, I put it in my DOS directory (which is in my path), and wherever I am, I can get a look at the subdirectories within the current directory.

RICHARD C. LEINECKER
REIDSVILLE, NC

Don't Lose a Thing

Have you ever been typing along when, all of a sudden, your computer mysteriously seizes up on you? Or perhaps a power failure or your failure to save a document before turning the computer off has cost you several hours' work? *WordPerfect's* timed backup feature can save you from the heartache of losing precious work. You can tell *WordPerfect* to save your work automatically at timed intervals. Here's how.

From the *WordPerfect* document screen, press Shift-F1 for Setup. At the Setup menu select 3 for Environment; then press 1 for Backup Options. You are now at the Setup: Backup screen. Press 1 for Timed Backup Options; then press Y for Yes.

You can set the intervals to anything you want, but remember that if you are working on long documents, *WordPerfect* could take some time to save them. If you set timed backup at every five minutes, you will be interrupted too often. Setting the intervals too far apart will run the risk of losing work completed between backups. Fifteen minutes is a good setting. Type the number of minutes you want; then press Enter and then F7 to exit.

WordPerfect will then automatically save your documents to a file with a BK1 extension (if you are using the Doc 2 screen, the backup is saved to BK2). The first time you boot *WordPerfect* after a crash or power failure, you are asked to rename the backup document. Name it some-

thing you will remember. Then retrieve the file you renamed from the WP51 (or WP50) directory the same as you would any other *WordPerfect* document.

WILLIAM HARRELL
VENTURA, CA

Perfect Spelling

Have you ever wondered whether you spelled a single word correctly in *WordPerfect*? Perhaps you are curious enough that you don't want to wait until you check the spelling in the entire document. If so, *WordPerfect* allows you to check one word, but doing so requires several keystrokes.

You can create a macro to check the spelling of one word with just one keystroke. After typing a word in a *WordPerfect* document and making sure that you have not hit the space bar yet, press Ctrl-F10 for Macro Define. At the Define Macro prompt, press Alt-W. If no Alt-W macro exists, *WordPerfect* will ask you to describe the macro. Type *check the spelling of a word* and press Enter. If a macro named Alt-W already exists, *WordPerfect* will ask if you want to replace it. Press 1 for Replace and Y for Yes; then type *check the spelling of a word*. (Note: If you don't want to replace Alt-W, you can define this macro with any Alt-letter combination you want.) The flashing *Macro Def* tells you that *WordPerfect* is now recording your keystrokes. Now check the word by turning on the spelling checker with Ctrl-F2. Press 1 for Word; then turn off Macro Define by pressing Ctrl-F10. If *WordPerfect* recognizes the word, the Check menu is displayed across the bottom of your screen. You can turn off the spelling checker by pressing Esc. If the word isn't in *WordPerfect's* dictionary, it's highlighted, and you have all

the spelling checker options for replacing or editing the word.

WILLIAM HARRELL
VENTURA, CA

Safe Disk Review

The importance of the information stored on a disk ultimately determines the value of the disk itself. When disks are cared for properly, they can remain operable forever. Here's how to extend the life of your disks.

- Do not interchange high and double density disks between high and double density disk drives.
- Clean the heads of the disk drives after every 100 hours of operation or every six months at a minimum. Align your drives once a year.
- When disks are not in use, it's preferable to keep them in an enclosed container.
- Always keep 5¼-inch disks in their paper sleeves.
- Acclimate all disk media for at least 24 hours before use if changes in ambient temperature are sudden or extreme. Keep disks away from direct sunlight where heat is not deflected. You should maintain the temperature around 50-125 degrees Fahrenheit.
- Never lay a disk on top of your monitor.

JAY STAHAN
KAO INFOSYSTEMS

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HARDWARE CLINIC

Mark Minasi

THE INCREDIBLE EXPANDING RAM

Last month, I discussed using the DOS 5.0 memory manager to create extra memory for DOS programs, in particular TSRs and device drivers. This month, I want to continue that discussion by talking about another kind of memory: expanded memory.

Most PC users eventually come to feel that 640K of memory—the most DOS will allow—is insufficient for most needs. Most 286- and 386-based computers have memory beyond 640K, called extended memory. Unfortunately, expanded memory is generally useless under most DOS programs—unless that DOS program was written with a kind of program development tool, called a DOS extender. One well-known example of a program that uses a DOS extender is *Lotus 1-2-3* version 3.1; it can use extended memory directly. That's good, but there aren't too many programs blessed with DOS extenders. So what to do?

Lotus Development faced exactly the same problem back in 1985. Lotus had captured the spreadsheet market with the runaway bestseller, *1-2-3* version 1A. Eager to improve its flagship product, Lotus feverishly worked to create version 2.0. *Lotus 1-2-3* version 2.0 had some really nifty features when compared to version 1A. But it also had a real problem—it took up more memory than 1A did.

Growing Pains

This was a problem because there were loads of *1-2-3* spreadsheets out there designed by pioneering spreadsheet users. Many of those spreadsheets had been built under version 1A for machines with 640K, and they used every single byte of mem-

ory. So the 1985 introduction of 2.0, with less free RAM, was viewed as something of a bad thing.

Lotus needed some extra memory from somewhere. It could have built a spreadsheet with a DOS extender, giving *1-2-3* access to extended memory, but remember that only 286 and better machines have extended memory. In 1985, very few people had 286 machines, and no one had a 386 machine.

So Lotus turned to Intel, the folks who build the chips. Intel used an old trick to get more memory for *1-2-3*, a trick called paging.

Recall from last month that the memory area from 768K to 959K is allocated for ROMs (Read Only Memories) on add-in adapter cards. Most cards don't use those addresses, leaving much of that space, called the Upper Memory Area (UMA), unused. So Intel and Lotus designed a board that placed a 64K memory window up at address D0000 hex, or 832K.

Now, adding another 64K doesn't sound like much help; that's why I said it was a 64K window, or, more correctly, a page frame. The idea is that Intel designed a memory system that could accept up to 8MB (it later became 32MB) of RAM—that is, RAM not addressed in the normal way, but in pages 16K in size. It works this way: A piece of software, such as *1-2-3* version 2.1, can direct this paged memory board to move any four pages—say, pages 20, 200, 215, and 470—from the paged memory into the four 16K slots in the 64K page frame located at 832K. Then *1-2-3* can put data into those pages, and the pages can be copied from the page frames to their original memory locations in the paged memory board.

Gang of Three

For some reason, this isn't usually called a paged memory board; it's called an expanded memory board. And Lotus and Intel weren't the only players here; Microsoft got involved a bit later on. This led to another name for these boards: LIM, for Lotus-Intel-Microsoft.

As of version 4.0, up to 32MB of paged or expanded memory (whichever you want to call it) can be installed in a PC. It's also sometimes known as the Expanded Memory Standard (EMS).

Basically, the LIM memory isn't viewed by the system as memory. All the PC knows is that there are pages of storage available—16K-sized pages. LIM can support up to 2000 of these pages, hence the 32MB maximum size. LIM boards allocate 64K of memory—enough space for four pages—somewhere in the reserved area between 640K and 1023K, so a program can manipulate up to four pages at a time.

LIM is manipulated, then, by pulling in a page from LIM memory to your computer memory's reserved area (this memory is called a page frame, and moving data to and from LIM and page frames is called paging), reading and/or modifying the page frame, and possibly writing the page frame back to the LIM memory.

So *1-2-3* version 2.1 supported LIM, and that was reason enough for people all over the PC world to go out and buy add-in LIM memory boards for their 8088- and 286-based machines.

Perhaps you're wondering if all this paging takes time. It does—LIM memory is slower than conventional memory. LIM gets around DOS's 640K limitation, but at a cost in speed. And these days we're

Call it what you like—paged, expanded, EMS, LIM—it can help you break DOS's 640K barrier.



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seeing more and more new applications use extended rather than expanded LIM memory.

I know all of this is confusing, so let's review. Extended memory can be used with (1) 286 or later machines, (2) DOS when used with a DOS extender, and (3) both *Windows* and OS/2. Expanded or LIM memory (1) can be used with any machine, XT and up, and (2) is only useful with applications designed to use it.

Doing the Limulation

Last month, I introduced the DOS 5.0 386 memory manager, EMM386.EXE. You saw that it was pretty neat in that it allows you to create new memory areas in the UMA. It also lets you put programs into those UMA areas, freeing up space in DOS's lower 640K. But a memory manager does another neat trick—it can take your extended memory and make it behave like expanded memory.

Recall that expanded memory is also called EMS or LIM memory, so this process—emulating LIM—has gotten the name *limulation*. It's useful because there are still a number of applications out there that can use LIM if it's present, so it's nice to be able to make some of your extended memory work like expanded.

I must stress that you need a 386-class machine to do this. It's possible to do limulation with a 286 machine, but only with a small subset of the 286 machines out there. This makes for a difficult buying decision for 286 owners—when buying a memory board for your 286, should you buy extended or expanded? (Remember that for 386 owners, it's easy—just buy extended, and limulate if necessary.) Many 286 memory boards are reversible for extended or expanded. These are good buys, as

you may need expanded today and want to be able to use extended later.

In general, limulators for 286s aren't a good idea, as full LIM 4.0 powers can't be emulated and the 286 isn't built to limulate.

Double Duty

So how do you make a memory manager like EMM386 do limulation as well as create and manage UMBs—Upper Memory Blocks, recall? You've already learned the hard parts. In last month's column, we invoked the memory manager, telling it to include and exclude certain memory areas with the following CONFIG.SYS:

```
BUFFERS=30
FILES=30
DEVICE=HIMEM.SYS
DEVICE=EMM386.EXE NOEMS
I=CE00-EFFF
DEVICEHIGH=SMARTDRV.SYS 512
512
```

The DEVICEHIGH= just loads SMARTDRV.SYS above 640K. The I=CE00-EFFF says, "Use the memory areas from 844K through 959K." If you missed last month, don't worry too much about it—it doesn't affect this discussion. I just carried it over for continuity's sake.

There's a separate keyword to activate limulation. In the case of EMM386, you replace *NOEMS* with *RAM*.

Remember the page frame? EMS needs a 64K window between 640K and 1023K for a page frame. That's 64K that gets taken out of your UMBs. As before, DOS's default locations for the page frame may not be the best, so you may have to step in and help EMM386 out. I change *NOEMS* to *RAM* in the EMM386 line and reboot.

You'll get different results on different machines, but

most machines just issue a message such as *EMM386 not loaded—page frame could not be set*. What it's saying is "I'm confused" or, put another way, "I'm DOS—and I'm lost." For some reason, EMM386 throws up its hands if you insist on employing the E0000-EFFFF area. (I'm going to shift to hex for this last bit. If you're uncomfortable with hex, use the *Calculator* that comes with *Windows* 3.0 to do the decimal/hex conversions.) Now, you could just give in and remove the I=CE00-EFFF parameter—in fact, I find that's what most users do. But it's a terrible shame, because then you end up with a wasted 64K. Left to itself, EMM386 will waste the area from E0000 to EFFFF.

We forced DOS to use the full address space before. This time, we'll force it to place the page frame at E0000-EFFFF; that way, we'll have a 64K-EMS page frame from E0000 to EFFFF and 72K of UMB space from CE000 to DFFFF.

The option we want is *FRAME=*. You specify the starting address of the page frame with, as before, the rightmost hex number dropped off. To specify a page frame starting at E0000, we just use the following.

```
DEVICE=EMM386.EXE RAM I=CE00-
EFFF FRAME=E000
```

That's all there is to it. Now you've got 256K of LIM memory available to your DOS programs. What if you want more LIM memory? Just put a number after EMM386.EXE, as in the following.

```
DEVICE=EMM386.EXE 512 RAM
I=CE00-EFFF FRAME=E000
```

That would set aside 512K of RAM for LIM emulation. □

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INTRODOS

Tony Roberts

MADE TO ORDER

For ten years now, I've had computers around the house during the holiday season. For each of those ten years, I've expected a holiday gift of something computer related. Either the members of my family can't believe I'd want something as practical as a computer program for Christmas, or they have no idea what an appropriate computer gift would be.

If you're in the same boat, this year can be different. If you haven't already upgraded to MS-DOS 5.0, start dropping hints now. It's an easy purchase even for someone with no computer knowledge. If you still need help, clip the following paragraph and leave it where it will be noticed.

Microsoft's MS-DOS 5.0 Upgrade is the perfect gift for anyone with a DOS-based computer. DOS is a program that allows a computer to run other programs, and MS-DOS 5.0 is the best version of DOS available. If you're wondering what to buy your computer-loving friend, the answer is simple—an MS-DOS 5.0 upgrade. It's the gift your friend would buy for him- or herself.

Once you have DOS 5.0 installed, take a moment to study the new options for the DIR command. If you don't feel like dragging out the manual, just enter HELP DIR at the command line to see a screenful of information about DIR and its new switches.

In addition to the /P and /W switches that have been around for years, DIR now includes /A to display files with specific attributes, /O to specify a sort order for your directories, /L to provide lowercase output, /B to provide bare output (filenames only), and /S to include subdirectories of

the current directory.

Of these, the /S switch is the most intriguing, since it provides a quick file find utility. For example, say you've forgotten where you stored a certain test file you created recently. Try the command DIR TEST*.*/S, and you'll see every file on your hard disk that begins with the letters TEST.

I use this syntax regularly to locate files pertaining to a specific client. When creating the files, I reserve the first two letters of a filename for a client code, usually the initials of the client's business. For example, the letters EM signify a business called Envirosense Management. The command DIR EM*.*/S shows me all the files relating to that business, including correspondence files in my word processing directory, page layout files in the PageMaker directory, and even invoice records in my accounting subdirectory.

The /O switch lets me order subdirectories in various ways. Normally, /ON is most useful to me for sorting the directory by name. Often, though, I want a good look at the most recently created files, so I sort by date, as in DIR /OD. To reverse the normal sort order, use a minus sign in the command. DIR /OS orders a directory by size with the largest files listed first. Use this command when you're short of disk space and want to determine which files occupy the most real estate.

In addition to permitting sorting by date, size, name, or extension, this command also includes an option to list subdirectories first, which results in a cleaner, easier-to-read directory listing. DIR /OGN creates a directory sorted by name with the directories listed ahead of the filenames.

You can display files with various attributes by using the /A switch. When executed from

the root directory, DIR /AH /S will display the hidden files on the entire disk. As you can see from this command, it's permissible to combine more than one switch in the same line.

Another new and handy switch is /B. This provides a listing of filenames only and can be combined with other switches. This command is useful when combined with DOS redirection to create a file that contains a list of selected files. DIR *.TXT /ON /B > FILELIST.DOC builds a directory of all the TXT files in the current subdirectory sorted by name. That directory is then stored in a file called FILELIST.DOC, which you can edit.

The best thing about these switches and options is that you don't have to remember how to use them. You can teach DOS which directory style you prefer. Then whenever you type DIR, you'll get a directory with all the switches and options you want.

This is accomplished through DIRCMD, an environment variable. My preferred settings are /L /OGN, which provide a lowercase listing sorted by name with subdirectories first. To make this my default directory, I included the command SET DIRCMD=/L /OGN in my AUTOEXEC.BAT file.

Whenever I use the DIR command, I get the information I want presented the way I want to see it. If I need different information for a specific case, I just specify it with the usual switches, and the command line switches override the default switches. You can even reverse the effect of the default lowercase switch by including a /-L on the command line.

The improved DIR command is one very basic way MS-DOS 5.0 makes computing easier. As many times as I use that command, it's nice finally to have it my way. □

Once you start using DOS 5.0, you're ready to explore the many new options for the DIR command.

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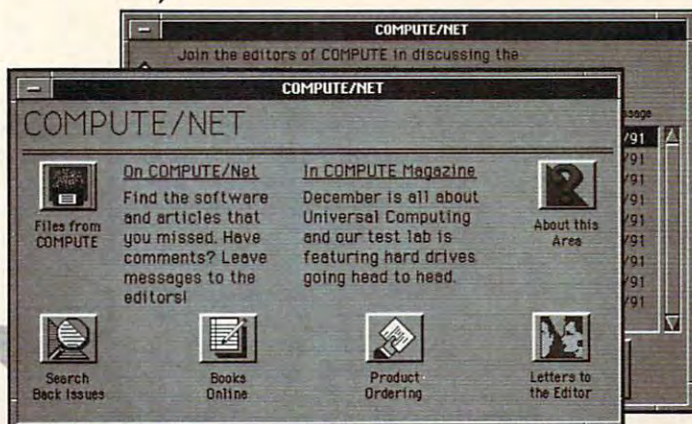
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COMPUTE/NET

Richard C. Leinecker

COMPUTE/NET: INTERACTIVE INFORMATION

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looking at software for your computer. We have an eclectic assortment of IBM, Atari ST, Amiga, and Commodore 64/128 files. On GEnie set the software library to what you're interested in. On America Online make sure you click on the correct computer type before you look through the files.

Because of our enormous volume of software, we'll be uploading until early 1992. That shows you what a wealth of resources we have to offer. Check the new files every so often so that you don't miss the latest uploads.

What else is up on COMPUTE/NET? Lots of back issues. Currently you can find back articles from January 1989 through October 1991. We'll keep the current magazines coming and, over time, work our way back to January 1987. And if there's a demand, we'll upload issues prior to 1987. Some of you have asked about the Getting Started booklets bound inside newsstand editions of *COMPUTE*, and those are there if you missed any of them.

There's another very important dimension to COMPUTE/NET. You can ask technical questions about your computer 24 hours a day and get answers very quickly—usually within a day. Here at COMPUTE we specialize in helping people who are new to computers and helping people who are seasoned veterans to expand their system's capabilities. This morning I fielded a question about shadow RAM. And as I read the messages, I saw half a dozen questions asked and answered in the course of one evening. If you want answers or have brilliant insights or solutions of your own, join us in our discussion areas. On GEnie it's our Bulletin Board—COMPUTE Round-Table main menu, choice 1. On America Online it's our

Talk to the Editors section.

COMPUTE has a history as long as that of the personal computer. We published our first issue in 1979. Those early issues covered machines like the PET, the KIM, and others, equally venerable, that have since departed. We were among the first to give serious attention to upstarts like the IBM PC and the Amiga.

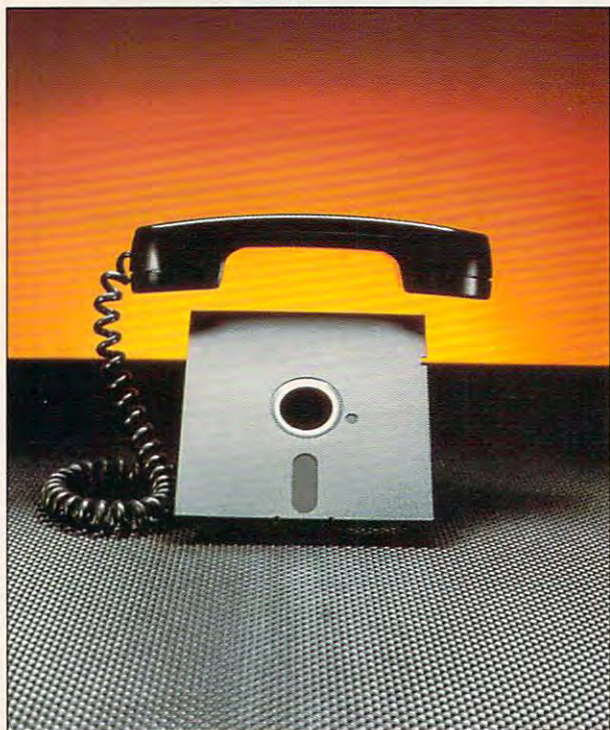
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PROGRAMMING POWER

Tom Campbell

OBJECT LESSONS

Most people know better than to ask me for programming advice, but when they do, the refrain they hear most is not to reinvent the wheel. And if you own an object-oriented version of *Turbo Pascal* (version 5.5 or later), you have a lot of reinventing *not* to do.

In other words, you may be wasting a lot of time rewriting code that comes free with every copy of *TP*. The *Turbo Pascal* class libraries represent a large body of well-written, well-tested code designed from the ground up for general-purpose use. If you plan to write a linked list, EMS handling code, or anything that uses buffered file I/O, you owe it to yourself to learn how to use the class libraries that come with *Turbo Pascal*. *Turbo*'s own documentation is not at its best when dealing with the class libraries; an otherwise good tutorial on linked lists in the OOP guide omits mention of the class library at all, and the reference documentation is hideously short of examples (the sample programs and tutorials will take you a good way there, however).

This month's column uses *Turbo*'s collections to implement a simple but functional database in a hundred lines of code. The database uses two fields, Name and Address, and sorts by name.

Collections let you store objects of any size in a dynamically allocated list that may contain up to 16K objects. This may sound only moderately interesting until you hear the whole story. The objects stored in a collection do not have to be of the same uniform size; that is, unlike in an array or most linked list implementations, you can store different types and sizes of objects in the same list.

Collections can be sorted

or unsorted; the only code you need to supply is a comparison routine. Procedures to add items, delete items, loop through the list one item at a time automatically, and even treat the list as an array are all supplied. All you have to do is let the collection know what kind of objects you want it to deal with, and library code takes care of the rest.

Think about this for a moment. Here is a canned set of routines that let you do all of the most common list-processing tasks your programs will need—and all you have to do is decide what data type you want to use and supply an occasional glue routine.

I once wrote a commercial product in C that used four different kinds of linked lists. Each kind required slightly different handling, so scattered throughout a 250,000-line program are four different sets of routines to allocate items for the list, add them to the list, deallocate the list, and so on. Finding a bug in one routine meant finding and fixing three other similar bugs in the other linked list code. It was not a pretty picture, as far as maintenance went. With objects, I would only have had to do the work once.

The first thing to do is define your data types:

```
PDatabase = ^TDatabase;
TDatabase =
OBJECT(TSortedCollection)
FUNCTION KeyOf(Item : POINTER)
: POINTER; VIRTUAL;
FUNCTION Compare(Key1, Key2:
POINTER) : INTEGER; VIRTUAL;
END;
PInfoRec = ^TInfoRec; TInfoRec =
OBJECT(TObject)
Name, Street : PString;
CONSTRUCTOR Init;
DESTRUCTOR Done; VIRTUAL;
END;
```

TDatabase is the name we give to an object type that de-

scends from the sorted collection type. Sorted collections have lots of neat features, such as automatic sorting and optional duplicate key suppression. By convention, object types begin with *T* and pointer types with *P*. The *KeyOf* and *Compare* routines are virtual because you may later decide to override them (that is, provide similarly named routines for different purposes in the same program).

Objects let you embed procedures and routines in them, calling them with the same notation used for records: for example, `Database^.ForEach(@PrintClient)`. But thanks to objects, you will see little of that in the accompanying program, because the collection routines that call the glue procedures defined in `COLLECT.PAS` are in the library code.

This sophisticated use of objects has a soft white underbelly: Type checking is frequently impossible because untyped pointers (similar to the void pointers of C) are required for truly reusable code.

The *KeyOf* function tells us what field to sort on. In a real application you could take advantage of *Turbo Pascal*'s virtual routines and allow sorting via any field in the database. It contains a single line in the example and uses typecasting, a relatively new language feature inspired by C's *KeyOf*: `:= PInfoRec(Item)^.Name;`

Since *Item* is an untyped pointer, the code `PInfoRec(Item)` forces the runtime code to treat the parameter called *Item* as a `PInfoRec`, or pointer to an `InfoRec` type. The dot means that it should further be constrained to treat it as a `Name` field, which is a pointer to a string. The caret means that *Item* is a pointer to a record, not the record

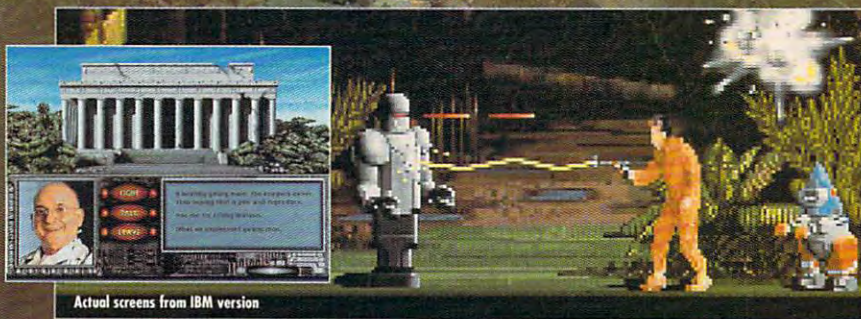
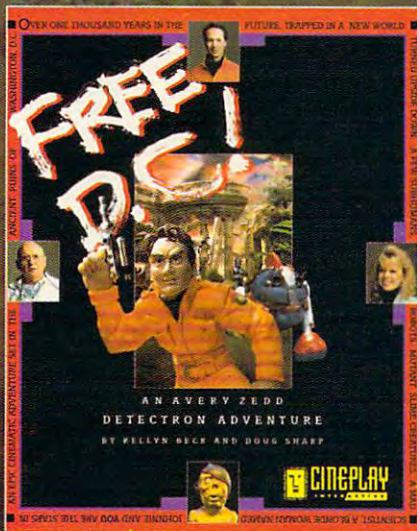
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itself. Why not just make the Item parameter a VAR InfoRec or PInfoRec? Because the TSortedCollection type must let *any* data type appear in the collection, and that means using Pointer types and casting them to the appropriate type.

The TInfoRec.Init procedure is a constructor, which means that it is called automatically when an object of type TInfoRec is allocated. Other than that, it's a regular, run-of-the-mill procedure.

Constructors ease maintenance greatly because one of the most common programming errors is forgetting to initialize dynamically allocated data. Constructors make it a lot harder to forget. This program is so small that it makes sense to put the data entry routine right in the constructor; more complex programs would normally put this in a different module.

The most interesting part of the program, and the toughest to cover here, is PrintAll, which lists all the clients. PrintAll uses the ForEach iterator (a term stolen from SmallTalk, like the concept of collections itself). An iterator routine steps through the collection item by item, while a routine you plug in deals with the item. One severe shortcoming is that the user-supplied code (PrintClient, in this case) must appear as a procedure nested within the ForEach procedure.

That's pretty much it—a database program in 97 lines. The price you pay for using the wealth of code in the class libraries is a few intense days with the *Turbo* manuals.

Learning objects isn't as easy as learning the drivers in the Borland Graphical Interface or deciding when a FOR loop is better than a WHILE, but it's high time you got started. You can't afford not to. □

This program is so small that it makes sense to put the data entry routine right in the constructor.

```
{ COLLECT.PAS -- Demonstrates sorted string collections. }
USES CRT, Objects; { The fundamental Turbo Vision unit. }
TYPE
  PDatabase = ^TDatabase; { Pointer to Database object. }
  TDatabase = OBJECT(TSortedCollection) { Minimal SortedCollection object. }
  FUNCTION KeyOf(Item : POINTER) : POINTER; VIRTUAL;
  FUNCTION Compare(Key1, Key2 : POINTER) : INTEGER; VIRTUAL;
END;
PInfoRec = ^TInfoRec; { Pointer to TInfoRec object. }
TInfoRec = OBJECT(TObject)
  Name, Street : PString; { These are the heart of the database. }
CONSTRUCTOR Init; { Allocate and enter data. }
DESTRUCTOR Done; VIRTUAL; { Reclaim memory at shutdown time. }
END; { OBJECT definition. }

{ Determine how the database is sorted. }
FUNCTION TDatabase.KeyOf(Item : POINTER) : POINTER;
BEGIN
  KeyOf := PInfoRec(Item)^.Name; { Cast this to a pointer to a Name string. }
END;

{ Compare strings as key values. }
FUNCTION TDatabase.Compare(Key1, Key2 : POINTER) : INTEGER;
BEGIN
  IF PString(Key1)^ = PString(Key2)^ THEN { Given pointers to strings, }
    Compare := 0; { return 0 for equivalence, }
  ELSE IF PString(Key1)^ < PString(Key2)^ THEN { -1 if left is lexically }
    Compare := -1; { below right value, and 1 if }
  ELSE { left is lexically above }
    Compare := 1; { right value. }
  END; { TDatabase.Compare }
END;

{ Allocate memory for an object; then immediately enter data for the object. }
CONSTRUCTOR TInfoRec.Init;
VAR
  NewName, NewStreet : STRING;
BEGIN
  WriteLn;
  Write('Name? '); ReadLn(NewName); { Get the name, and init to a null }
  IF Length(NewName) = 0 THEN { string if user enters nothing. }
    NewName := '';
  Write('Street? '); ReadLn(NewStreet); { Ditto for the street. }
  IF Length(NewStreet) = 0
  THEN NewStreet := '';
  Name := NewStr(NewName); { Copy contents of local vars to }
  Street := NewStr(NewStreet); { dynamically allocated strings. }
END; { CONSTRUCTOR Init }

{ During shutdown, this deallocates memory for each record. }
DESTRUCTOR TInfoRec.Done;
BEGIN
  DisposeStr(Name);
  DisposeStr(Street);
END; { DESTRUCTOR Done }

{ Use the snazzy ForEach iterator method to go through each record in the
database and call a nested procedure. The nested procedure here simply
prints the field names and contents. }
PROCEDURE PrintAll(Database : PCollection);
PROCEDURE PrintClient(Info : PInfoRec); FAR;
BEGIN
  WITH Info^ DO
  BEGIN
    WriteLn('Name: ', Name^);
    WriteLn('Street: ', Street^);

    WriteLn;
  END; { WITH Info^ }
  END;

{ Boilerplate code to call ForEach on each record in the collection. }
BEGIN
  Database^.ForEach(@PrintClient);
END; { PROCEDURE PrintAll }

VAR
  Database : PSortedCollection;
  Choice : CHAR;
BEGIN
  { Allocated to initialize a sorted collection. This creates a ten-item
collection. When memory is allocated for new items after ten, it's
allocated in five-item chunks for speed (rather than single-item chunks,
which would slow performance). }
  Database := New(PDatabase, Init(10, 5));
  REPEAT
    ClrScr; { Each iteration of the }
    WriteLn('1. Add an item'); { main loop clears the }
    WriteLn('2. List the database'); { screen, prints a simple }
    WriteLn('3. Quit'); { menu, and awaits a }
    Choice := ReadKey; { keystroke. }
  CASE Choice OF
    '1' : Database^.Insert(New(PInfoRec, Init)); { Get a new record. }
    '2' : BEGIN { Print header before list }
      WriteLn; { is printed; then print }
      WriteLn('-----'); { the collection. }
      PrintAll(Database);
      Write('Please press Enter to continue. ');
      ReadLn;
    END;
  END; { CASE Choice }
  UNTIL (Choice = '3') OR (Choice = #27);
  Dispose(Database, Done); { Deallocate the database. }
  Halt(0);
END.
```


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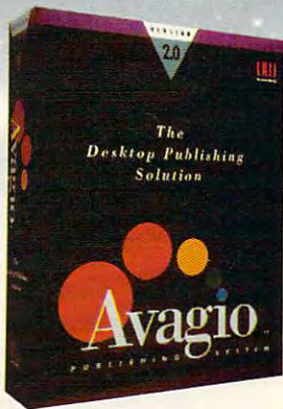
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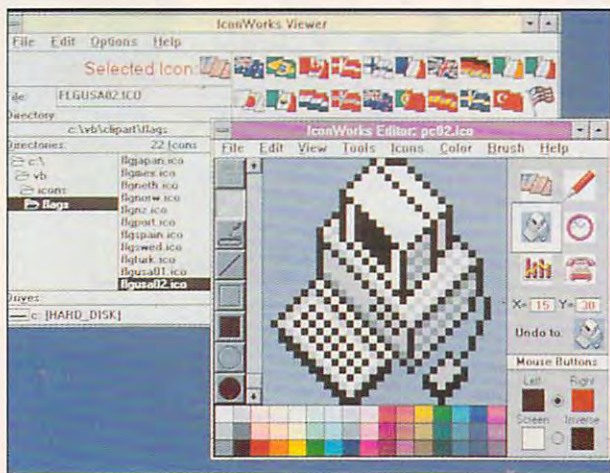
EXTEND VISUAL BASIC FOUR WAYS

As I pointed out last month, one of the most exciting things about *Microsoft Visual Basic* is that it's extensible. Extending a language is nothing new, but the power of *Windows* combined with *VB*'s open design creates an unusually rich environment for add-on developers.

From *Windows*, *VB* gets the ability to use DLLs (Dynamic Link Libraries)—routines linked at runtime rather than at compile time. And unique to *VB* are custom controls—*Visual Basic* extensions (VBXs)—that become part of the *VB* design and runtime environments.

The custom control camp is

Custom Control Factory and ButtonTool are both excellent ways to extend the power of Visual Basic.



represented by two excellent programs: *ButtonTool* (OutRider Systems, 3701 Kirby, Suite 1196, Houston, Texas 77098; 713-521-0486; \$49.95) and *Custom Control Factory* (Desaware, 5 Town & Country Village #790, San Jose, California 95128; 408-377-4470; \$48.00). Both of these programs dramatically increase *Visual Basic*'s button power.

ButtonTool couldn't be much easier to use. To access the program's custom button control, you load the BTOOL.VBX file into *VB*'s de-

sign environment, and a new button tool appears on your toolbox. To create a button, you select it and draw your button the way you would with *VB*'s native button control. When you look at the properties bar, you'll see the difference between this button and *VB*'s.

ButtonTool adds 23 properties to *VB*'s already healthy group of 21. For starters, you'll find 3-D shading and thickness, button down (which allows you to control exactly how the button looks when depressed), toggled (which allows you to treat command buttons like the option or check buttons used on tool bars), and symbols (which allows you to place 18 predefined symbols or your own bitmap, metafile, or icon on a button top). The ability to add a graphic to a button is especially welcome. It's amazing that Microsoft left this feature out of *VB*'s first release.

After you've compiled your *VB* program with *ButtonTool*'s controls and you're ready to distribute it, you need to include BTOOL.VBX runtime, which weighs in at a mere 14,288 bytes. The Runtime can be distributed royalty-free.

Desaware's *Custom Control Factory* (CCF) offers button control features similar to OutRider's, but *CCF* includes animated buttons and multi-state check buttons.

You use *CCF* just the way you use *ButtonTool*. You choose Add File from the File menu and load CCBUTTON.VBX. However, when you draw a *CCF* button on your form, you're starting at square one. You'll see a blank button with handles for moving and resizing. You have to build most of its properties yourself. *CCF* is powerful and correspondingly more difficult to use than *ButtonTool*. Programs compiled with *CCF* require you to distribute the 94,960-byte CCBUTTON.VBX runtime.

Like *ButtonTool*, distribution of this runtime is royalty-free.

ButtonTool and *CCF* are both excellent ways to extend the power of *VB*. When you find yourself wanting runtime routines, look at packages from MicroHelp and Crescent.

MicroHelp's *VBTools* (4636 Huntridge Drive, Roswell, Georgia 30075; 404-594-1185; \$129) combines some unusual custom controls with a large toolbox of routines and forms. Controls include mouse scroll bars, an enhanced list box, 3-D labels, playing cards, percent gauges, and an enhanced text box.

Custom forms include a color editor, automatic text recall, project windows, and file selection routines. The library of runtime routines reinstates some common BASIC keywords Microsoft omitted from *VB* (like BSAVE and BLOAD) and contains graphics special effects, many examples of using the *Windows* API, and a blackjack game. Runtime modules can be distributed royalty-free.

VBTools is an impressive collection of controls, custom forms, and utilities. MicroHelp also touts a communications library and another collection of subroutines called *Muscle*.

Crescent Software's *QuickPak Professional* (32 Seventy Acres, West Redding, Connecticut 06896; 203-438-5300; \$199) was still in prerelease when I reviewed it, but the software was very stable. This product obviously tries to provide every subroutine you'll ever need.

If you've used Crescent's *QuickPak Professional* for *QuickBASIC* and *MS-BASIC*, you have an idea of what's inside—lots of routines, most with source language included. More than just a translation of previous *QuickPak* modules, this collection boasts a large number of *VB*-specific routines. I'll include an update when I've seen the finished product. □

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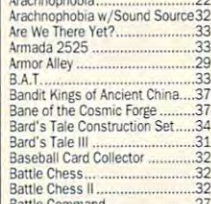


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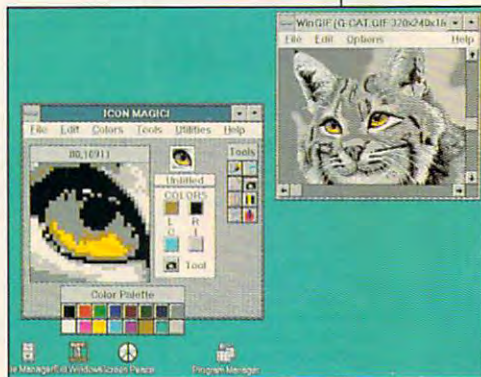
ON DISK

Tony Roberts

MAKE TIME, MANAGE ICONS, AND MORE

For those in our audience who like precision, one of this issue's programs is a must. It allows you to set your computer's clock from the cesium-beam atomic clocks at either the U.S. Naval Observatory in Washington, D.C., or the National Institute of Standards and Technology in Boulder, Colorado.

Icon Magic allows you to capture and edit icons from EXE files, permits drawing in 16 colors, and includes a snapshot tool.



Timeset 6.0 is the most accurate and the most complete of several time-setting programs we looked at. Programmer Pete Petrakis has been at work on this gem for several years, keeping it in tune with the times, so to speak.

Timeset 6.0 directs your modem to call one of the atomic clocks and to receive the time string that's constantly being transmitted. Upon receiving the official time, *Timeset 6.0* sets your computer's clock, taking into account even the tiny lag between the instant the time string was sent and the moment it could be processed by your computer. The length of a typical time-setting phone call is something less than four seconds.

Once your computer's clock is set, you can display the time in large numerals on-

screen to help you bring your other timepieces into compliance. Depending on your own accuracy requirements, you can run *Timeset 6.0* several times a day or once every few weeks.

Timeset 6.0 is shareware that carries a \$35 registration fee. Registration entitles the user to technical support, a printed manual, and discounts on future upgrades. Registered users also receive an evaluation copy of *Right Time*, a companion program that learns to compensate for the inevitable drift

in your computer's clock.

Even if you don't plan to use this program, read the documentation on this month's disk for an engaging discussion on the subjects of time-setting, line delays, and computer clocks.

Icon Magic

For all its power, *Windows 3.0* is perhaps best loved for its icons and screen savers. We've seen people caught up for hours in making their desktops look just right.

The *Icon Magic* program on this month's disk provides top-flight tools for desktop artists. *Icon Magic* makes creating and managing icons a breeze.

The creators of this shareware offering, Steve Stedman and Jeff Ayars, are rightfully proud of their program. "When we decided to write this program, we decided to do it with the commitment of making the best icon-drawing program we could," Stedman says.

Their goal was to provide more tools than were available in other icon-drawing pro-

grams, and they succeeded. In addition to the usual drawing tools, *Icon Magic* includes clear and inverse functions, allows you to capture and edit icons from EXE files, permits drawing in 16 colors, and includes a snapshot tool that can grab images directly from the screen and turn them into icons.

Stedman and Ayars are university students in Washington state who plan to pursue careers in *Windows* application development. *Icon Magic* is shareware. Anyone using the program after an evaluation period should send in the \$15 registration fee.

Delete Except

Michael Earl's *Delete Except* is one of those specialty tools that we like to have available when the situation dictates.

Delete Except works just as its name suggests. The program deletes all files in a subdirectory *except* those specified in the command line.

For example, `DEX *.ZIP` would clear out everything but ZIP files; `DEX WIN*.*` would delete all files in the current subdirectory but those beginning with the letters *WIN*.

Earl, a student at the University of South Florida, offers *Delete Except* as freeware. No registration fee is required to use this excellent program.

XPATH

XPATH helps break the nagging 127-character barrier that even the latest versions of DOS impose on the *PATH* statement.

With more and more programs *demanding* a place on the directory path these days, I've found myself writing special batch files that alter the path as I run and exit from certain programs. Thanks to *XPATH*, I can now retire those batch files.

XPATH allows you to cre-

HOME OFFICE

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George Campbell

VISUAL BASIC

With *Windows 3.0* just 18 months old, the rush to create programs for that operating environment is on. Until now, though, writing software for *Windows* was difficult, to say the least. *Visual Basic* changes all that. With its introduction, Microsoft has made it easy for anyone with BASIC programming experience to create software for *Windows 3.0*.

While it takes about 100 lines of code using C and *Microsoft Software Development Kit (SDK)* to do something as simple as print *hello* on a *Windows* screen, *Visual Basic* can do the job with one simple line, using the old familiar *Print* command. Simple ideas often herald revolution!

Priced at \$199, this new programming environment begins to prove its worth right out of the box by installing in just a few minutes. The included interactive tutorial takes you through the first phases of creating a *Windows* program, and full-scale online help supplements the two manuals. With the familiar *Windows* dialog boxes and menus, you'll soon be comfortable with the interface.

Since you learn new programming languages best by example, Microsoft offers plenty of examples in its manuals and tutorial. You also get several sample programs, ranging from a simple card file to an outstanding icon viewer and editor. You can use all or part of these samples any way you like, without worrying about paying royalties. Finally, *Visual Basic* can create EXE files, unlike *ToolBook* or other comparable authoring systems. You'll still need *VBRUN100.DLL*, *Visual Ba-*



sic's runtime dynamic link library, but you can distribute it free with your programs.

If you're familiar with *QuickBASIC*, also from Microsoft, writing code in *Visual Basic* will present no real challenges, but that's where the similarity ends. *Visual Basic* works in a way that's completely different from what you're used to, and that's its charm.

Instead of the laborious process of creating a user interface in another language, *Visual Basic* lets you simply draw the interface on the screen. Starting with an elementary window, which Microsoft calls a form, you use a toolbox similar to those in drawing programs to add controls—command buttons, check boxes, text and picture boxes, and other elements—to the form. Your program can have several of these forms.

Sizing and positioning forms and controls is as simple as clicking and dragging the mouse. *Visual Basic* even includes list and combo boxes like those in most *Win-*

dows applications.

There's more. Since any *Visual Basic* program uses all the facilities of *Windows 3.0*, you won't have to worry about printer or display availability. You can also use the *Windows* Dynamic Data Exchange (DDE) functions to form links with other programs or call on *Clipboard* for cut-and-paste operations.

More than just attractive objects, the icons from the toolbox provide you with the functions that they illustrate, and you don't need to write a single line of code. For example, a text box automatically provides normal text-editing functions, from word-wrap and text selection to keyboard cut-and-paste operations. Similarly, adding a file list box to your form automatically gives you the ability to select files when your program runs. A menu design option in the *Visual Basic* menu lets you design a menu bar, complete with nested menus, by simply typing in menu names.

For each object on the screen, you can set options,

ranging from background color and border type to text fonts and the type of mouse pointer used in the display. Any object can be visible or invisible, and you can change most options with simple commands as your program runs. Adding graphic images is a simple matter of loading a bitmap file into a picture object. All this means that you spend your time designing a terrific interface for yourself or other users without worrying about how the interface works.

Once your interface looks the way you want, you begin to write the program itself. Here, too, *Visual Basic* will surprise you. Using what Microsoft calls event-driven programming, you write code to tell *Visual Basic* what to do when the user takes some kind of action, such as clicking on a command button, pressing a key, or clicking the mouse. When you're designing your program, a double click on any object takes you to an editing screen. Then, you choose an event from a drop-down list and write the code needed to handle that event. For example, to tell your program what to do when a user clicks on a command button or a menu entry, you select the Click event and then write your code, using language and syntax similar to that in *QuickBASIC*.

Unlike *QuickBASIC*, however, some elements of the *Visual Basic* language feel both familiar and different at the same time. Although *Visual Basic* isn't an object-oriented language in the technical sense, it does deal with objects. For example, the familiar old Print command must be preceded by the name of the object. To print to the printer, the command `Printer.Print` is used. To print to a text box object, the command

would be `Text1.Print`. It's easy to get used to this new syntax, however.

You'll miss some old familiar *QuickBASIC* commands such as `Play`, `Inkey$`, and `Chain`. These missing commands aren't needed in most programs, however, and *Visual Basic* offers its own equivalent commands.

Some missing language features, however, make *Visual Basic* programming more difficult. While you're in a loop in a program, you can't watch for a keystroke and then exit from the loop. Also, there's no way to determine what line your cursor is on in a text-editing box. While you can write your own routines to handle these needs, they'll run slower than built-in commands.

Also on the negative side, locating a particular part of your program when you're editing sometimes proves difficult. Rather than keep your code together, *Visual Basic* scatters it into many separate modules. Before long, though, you'll learn the system and forget this minor inconvenience.

When it's time to debug your program, *Visual Basic* has all the tools you need, ranging from stepped execution and breakpoints to the ability to restart the program after making changes. And your *Visual Basic* programs run quickly, so you won't be slowed down when using programs you've written.


One of the best things about *Microsoft Visual Basic* is that there are already a large number of add-ons to help both beginning and advanced programmers get more from the product.

Microsoft itself has led the way here with its *Control Development Kit*, which allows ad-

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Microsoft Visual Basic

Programming System for Windows



Microsoft

vanced *Windows* programmers to create custom buttons and other controls.

Also from Microsoft is the *Windows Help Compiler*, which gives both beginning and advanced *VB* programmers all the tools they need to create online help that's the equal of any *Windows* program's online help.

Both products are available from Microsoft, One Microsoft Way, Redmond, Washington 98073; (206) 882-8080. *Control Development Kit* and *Windows Help Compiler* sell for \$49.95 each.

If you have a yen to create your own programs for *Windows 3.0*, Microsoft has opened the door wide with this amiable programming environment. *Visual Basic* can turn anyone familiar with *BASIC* into a *Windows* programmer almost instantly. □

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WORKPLACE

Daniel Janal

REMOTE-CONTROL SOFTWARE

If there's a remote chance you'll need to access your files, use a printer, or send a fax while you're away from the office, try a remote-control program.

There are several software programs on the market now that let you access office computers from your home. Among those are *Commute* from Central Point Software (15220 NW Greenbrier Parkway, Suite 200, Beaverton, Oregon 97006; 503-690-8090; \$129), *CO/Session* by Triton Technologies (200 Middlesex Turnpike, Iselin, New Jersey 08830; 800-322-9440; \$195), and *pcANYWHERE* by DMA (1776 E. Jericho Turnpike, Huntington, New York 11743; 516-462-0440; \$179).

In a nutshell, these programs let you run your office computer by remote control. You load the software into your home computer and your office computer. When you leave the office at night, you

leave both the office computer and modem turned on. The software allows you to do more than just upload or download files. You're actually able to operate your office computer from home, run whatever applications you want, transfer files, and even print out files.

Some interesting uses for remote-control software have developed along the way. For example, one user starts the computer from home in the morning and tells it to update and print reports based on sales figures gathered the evening before. By the time he gets to work, the reports are ready. This can be really handy when you have large jobs like month-end financial statements. The report prints, and you don't have to babysit the computer in the meantime.

You can also send and receive faxes from your home. For laptops, the uses are far reaching—literally. Instead of manually transferring files to your laptop before a trip, just load in the remote-control software and access your office computer from a hotel room.

For something really cool, you and your associate can work on the same file at the same time, taking turns editing and revising a document. You make your comments; your associate responds. How's that for instant feedback?

As for computer troubleshooters, can you imagine how much easier it would be to get support for your PC if someone looked at your AUTOEXEC.BAT file and CONFIG.SYS files remotely? My experience has been that a lot of users don't know what or where these files are, so the customer-support person has to spend a lot of phone time describing how to change directories and how to use the TYPE and EDLIN commands before finding the problem. Remote-control software could

easily eliminate that problem.

So what's to prevent competitors or mischievous coworkers from peeking inside your computer? Plenty. Security is built into most systems through passwords. Busybodies have as much chance of reading your spreadsheet as they do of seeing your bank account balance on an ATM machine.

Security doesn't end with passwords, however. You can determine how much access a person has to your system. For instance, someone might have access to the spreadsheet program but not the accounting program. Another person might have clearance to read files but not overwrite them, while a third person could have clearance to read and write files.

Here are a few tips: In a perfect world, modems should talk to each other, regardless of the manufacturer. However, for the best possible communication (the least amount of hassle and error), use modems made by the same manufacturer. Also, if you're using graphics files or a graphics-based program like *Windows* or *AutoCad*, a high-speed (9600-baud) modem will pay for itself many times over in the time you save. For text and spreadsheet applications, a 2400-baud modem is fine.

One other potential area of conflict is with TSR programs, those handy utilities that sit in the background just waiting to make your life easier. Since remote-control programs are also TSRs, the chance for memory conflict exists. Test your system before remotely transferring mission-critical files.

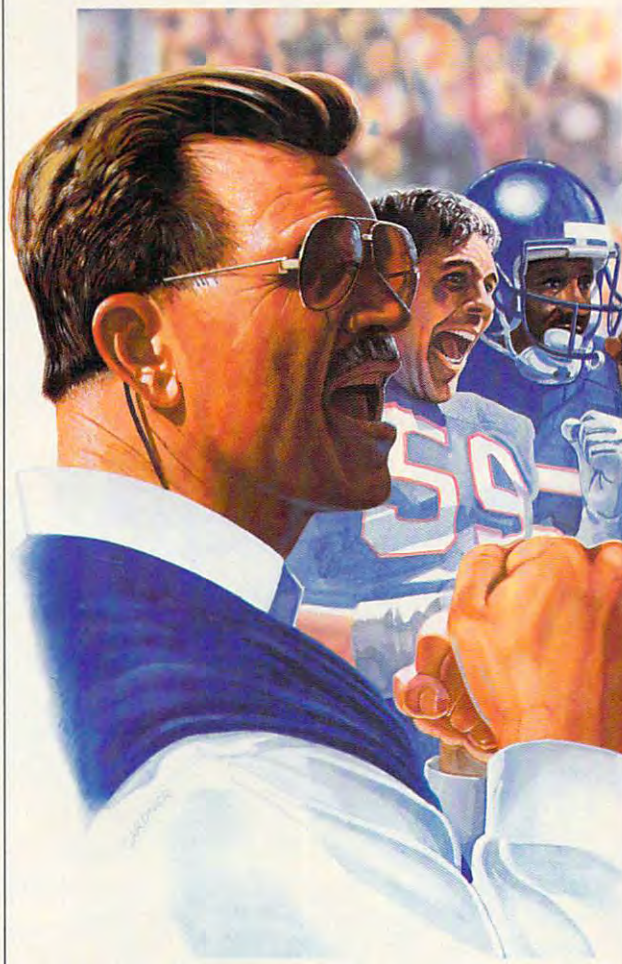
Also, because TSRs eat memory like Jethro at Granny's picnic table, you might not have enough memory to run your main applications. If this happens, determine which other TSRs you can live without so you can accomplish your remote tasks hassle-free. □

Load remote-control software in your laptop before that next trip and run the office from your hotel room.



Mike Ditka
Ultimate Football

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AND TAKE NAMES.

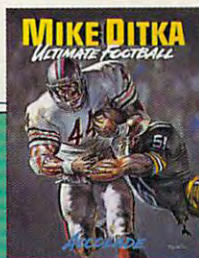
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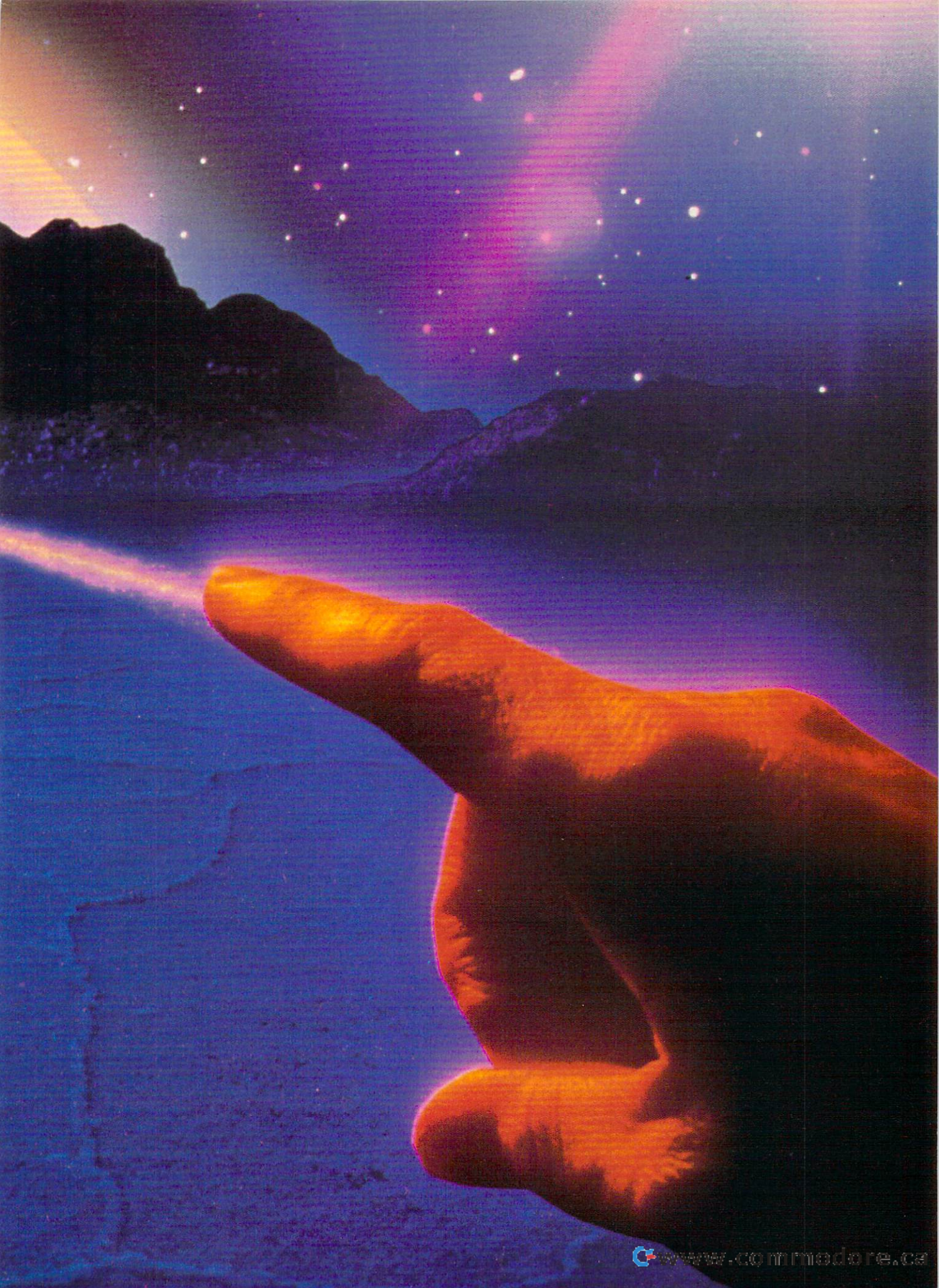
YOU'RE AS GOOD AS THERE

BY GREGG KEIZER

Get with it. Take a cue from your TV's channel changer, from manmade probes circling Venus, even from your garage door opener. Remote control makes it possible to select, command, and operate everything from million-dollar robots in space to your cable box, all without leaving the home planet or the comfort of your chaise lounge or easy chair.

PC remote-control software lets you step away from the confines of a corporate office or the limitations of a puny laptop. You can run your computer long distance, with the help of some software, a modem, and the telephone lines. You can control a PC a thousand miles away, just as if you had sat down in front of its keyboard.

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Invasion of the Computer Snatchers

You're on the road, far from home and your home office. Or you're tucked into your office at home, working late on a project due tomorrow. But your nagging suspicion has turned out to be true; you left some important files and programs on the other PC—indispensable customer lists and data handlers. The hours you set aside to work have been wasted by a simple oversight. It costs you time and money.

This scenario plays all too often for anyone who uses more than one computer in more than one place. It used to be that all you could do was groan with frustration. Now you can laugh it off—if you have a remote-control package ready to run.

Using modems at both ends and a telephone line in between, remote-control software turns one computer into a host, the other into a guest. Normally, the guest computer calls the host and then takes it over. Connect the two computers with remote-control software, for instance, and anything you type on the keyboard of the guest appears on the screen of the host.

Remote-control software can link the two computers as closely as Siamese twins. You can easily send files, grab files from the host PC, or—if there's someone at the other end—even work interactively on the same document or work sheet (many consultants and software engineers use this capability to train users in remote locations).

The host can be a stand-alone computer at your home or work office or a machine linked to your corporate local area network (LAN). You can access its disk drives and any printer connected to it or, if the host is part of a LAN, you can even read and respond to your E-mail.

Remote-control software can be a real help to the home office worker, acting at times like a personal electronic bulletin board system, at others like a distant terminal of a primary PC. It multiplies the power of a PC that isn't tied to a network.

You can, for example, head home early from the office and later that night connect to your workplace PC. When you finish a memo or report, you can print it on your office laser printer so that it will be waiting for you in the morning. If you travel with a laptop, you can complete work on the road and then safely store it on your home office PC via the telephone. Or you can access a file or application you couldn't fit on your portable's small hard disk drive. And if you're working for a long-distance client, you can collaborate in realtime and interactively compose a report or design a newsletter.

Remote Commuting

One of the best remote-control packages is also one of the newest. Central Point Software's *Commute*, offered both as part of *PC Tools Deluxe 7.1* and as a separate program, is about as simple to use as remote software gets. Highlights include a clear interface, data compression to speed up file transfer, and features that automate parts of the process. Other programs own a bigger slice of the market—*Carbon Copy Plus*, *Close-Up*, *pcANYWHERE*, and *CO/Session* come to mind—but the new product from Central Point has earned a niche and deserves your attention.

Calling and control with *Commute* are straightforward. You install the software on both host and guest, set up the host to wait for a call, and then tell



Server Technology's Power-ON



Triton Technology's CO/Session

the guest to phone home. In moments, you can access the host's drives or send files to its printer. The display and control, minus momentary pauses for telephone transmission, is identical to what you would see sitting at your office machine.

Along the way, *Commute* lets you specify the callers who can legitimately connect to the host, locks out certain callers (or everyone) from accessing drives A: or B:, and prevents guests from rebooting the host (either accidentally or maliciously). Security-conscious, *Commute* requires callers to identify themselves with the proper password before it completes the connection to the host. You can even set *Commute* so that the host calls back

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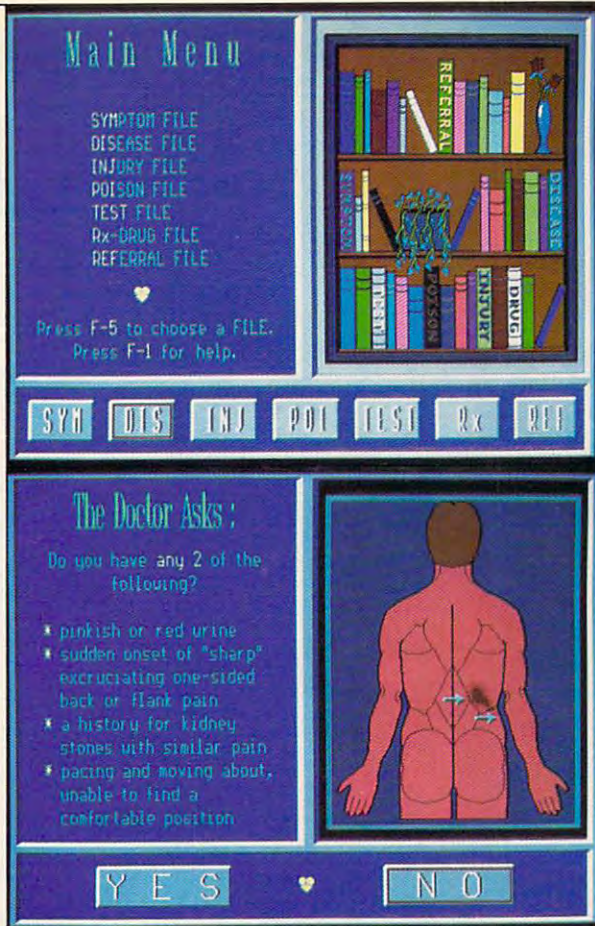
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Circle Reader Service Number 169

the guest computer after a few seconds on the line, in effect reversing charges so that the call will be billed to your office phone. If you're calling with a credit card or from a hotel or if there's a time difference in your favor, this feature could provide lower rates.

Sending and transmitting files—easily the most popular application of remote-control software for home office workers—could be easier. You have to provide the path and filenames for both source and destination files, a clumsy manual method that could have been avoided if Central Point Software had thought to provide a graphic directory tree approach instead. Nonetheless, transferring files between host and guest goes like clockwork. You can even transfer subdirectories and their entire contents in a single step.

If you repeatedly step through the same process—filing sales reports from the road, for instance—you can automate *Commute* so that it calls, sends DOS commands to the host, sends or receives files, and hangs up without your attention. *Commute* can even call by itself late at night when phone charges are the lowest. You get to choose the remote-control software if you work for yourself, but your hands may be tied if you want to con-

nect with a corporate PC, especially if it's on a LAN. *Commute* handles LAN traffic, too, but your firm may have already standardized on something else, such as *Carbon Copy* or *pcANYWHERE*. All remote-control software works much the same, though, with the crucial differences being in interface, screen speed, and LAN compatibility.



Norton-Lambert's Close-Up

Fast, Secure Control

Remote-control computing depends on the telephone, so the faster you take care of business, the lower your costs will be. When you go to remote control, equip both the host and the guest with the fastest modems you can afford. You will probably find products that claim to work at 1200 bps, but if you value your peace of mind and

your time, you will want faster rates.

The guest PC's screen is updated via the phone connection, a laborious and expensive process if you're working with 1200- or 2400-bps modems. Move up to 9600-bps modems if you can. It's especially critical to run a fast connection if you're expecting to control *Windows* software running on the host from the guest. (Several *Windows* remote-control programs are nearly ready as this is written and will be available by the time you read this. Chief among these is Ocean Isle's *Reach Out for Windows*. It requires VGA and a mouse on the host and VGA, mouse, and 512K RAM on the guest. It can make do with a 2400-bps modem, though 9600 bps is recommended. Ocean Isle can be reached at 80 Royal Palm Boulevard, Suite 202, Vero Beach, Florida 32960; 407-771-4777.) Practical Peripherals' PM9600SA is an excellent choice because it includes advanced error correction and data compression features and is often discounted to around \$450.

A speed-of-light remote-control connection won't help if the host PC isn't powered up. To ensure that the host is always waiting, you can try one of two approaches. The first, a remote-control power strip, lets you turn on the PC's power with a phone call. You plug the

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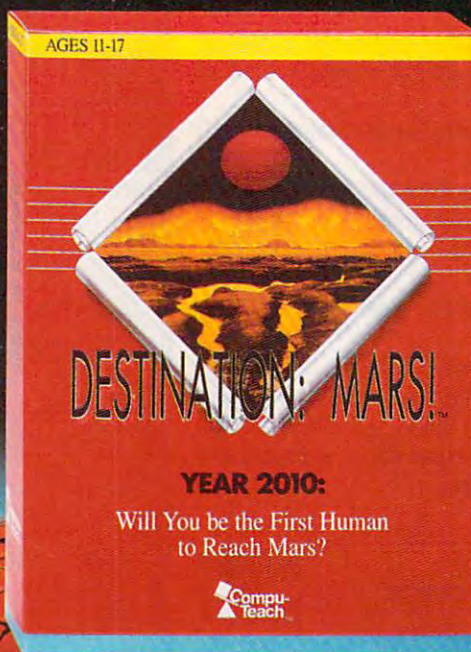
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computer and peripherals into the strip and then connect it to the phone line via a built-in jack. Call home, for example, and enter the security code, and your home office PC starts up. Server Technology's Power-ON is a compact four-outlet unit that you can conveniently stash on the floor of your workspace. When you complete the session and hang up from the guest, the Power-ON powers down the host PC until the next call.

If you want to leave the host on all the time but need to make sure it doesn't go down if the power fails, consider an internal power supply (IPS) like the Powercard. Its board fits inside the PC and connects to the computer's own power supply; an external battery provides temporary power. The Powercard detects even the briefest interruption of power, kicks in its battery, and then saves an image of memory to disk. As soon as the electricity revives, the PC is ready to take your call.

Do It from a Distance

Controlling a computer by long distance can make or break a road trip or a workday at home. No matter where you go, remote control software lets you stay in touch with your most important assistant—your PC.

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Beaverton, OR 97006
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Triton Technologies
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1-908-788-2799.

ARTS & LETTERS

Robert Bixby

VENTURA OR PAGEMAKER?

Which is better: *Ventura Publisher 3.0* for *Windows* or *PageMaker 4.0*? When earlier versions of these products were available and *Windows* was much less a force than it is today, the correct answer to that question was a courageous "It depends." What it depended on was whether you had *Windows* and whether you were publishing or doing page makeup.

If you were creating books or newsletters, certain features of *Ventura Publisher* were particularly suited to your work. For more fanciful jobs, such as creating posters or making up individual pages (like the opening spread of a magazine article), *PageMaker* was the clear winner, having so many design features *Ventura* lacked or that were easier to use. And then some people were more tolerant of *GEM* (the operating system shell under which the original *Ventura Publisher* ran) than others.

Now that even Digital Research seems to be accepting

the fact that *GEM* will eventually be relegated to the slag heap of history, *Ventura* has made the transition to *Windows*. However, its makers pledge to continue supporting the *GEM* version—they claim it's the only viable alternative for those who are interested in top-of-the-line desktop publishing using only DOS.

To test these products, I put together a series of 32-page books. My resulting impression is that *PageMaker* makes much better use of *Windows* resources (no surprise there—*PageMaker* was available for *Windows* for years before *Ventura Publisher* was).

PageMaker formats faster and prints faster (by a wide margin), and its editor makes simple text editing much easier to do than in *Ventura*. I also liked *PageMaker*'s interface better. It allowed freer movement among pages.

Most of the problems with *Ventura Publisher* for *Windows* have to do with the fact that it isn't as mature a product as *PageMaker*. For example, the odd and even printing option in the Print dialog box doesn't work. *Ventura* paid little attention to the setup and has always balked when Setup specifies portrait printing and the Page Setup dialog box specifies landscape printing. If I don't go back and make the change in *Ventura Publisher* (and even sometimes when I do), the program will crash immediately after printing. And if I don't think to save my most recent changes, I'll lose them.

Ventura Publisher has one distinct advantage, however, that overcomes all the disadvantages: While *PageMaker* combines all the data necessary to generate a document into a single file, *Ventura Publisher* maintains all of its files separate from one another.

This is a significant advan-

tage; it allows you to edit in the word processor or text editor of your choice. Any changes made in the text will be instantly reflected in the *Ventura* document without the need for further importing or cutting and pasting.

You can really appreciate this feature when you need to update a document with an outside application. For example, suppose you're confronted with the task of creating a newsletter, the back page of which lists the top sellers of a company's inventory. The file that makes up the back page can be the product of a database that's programmed to spit out the names, descriptions, and prices of products that have shown the most activity in the past 30 days.

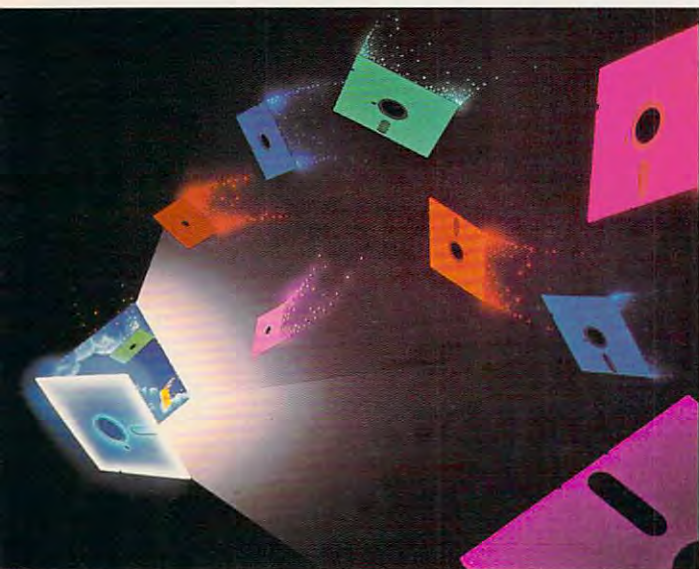
Most databases can be programmed to print out text, such as the text you might find in a form letter. By telling the database to print to file the format tag for the product name, the product, the tag for the description, the description, and so on, you'll end up with a perfectly formatted text file, ready to be printed with *Ventura Publisher*.

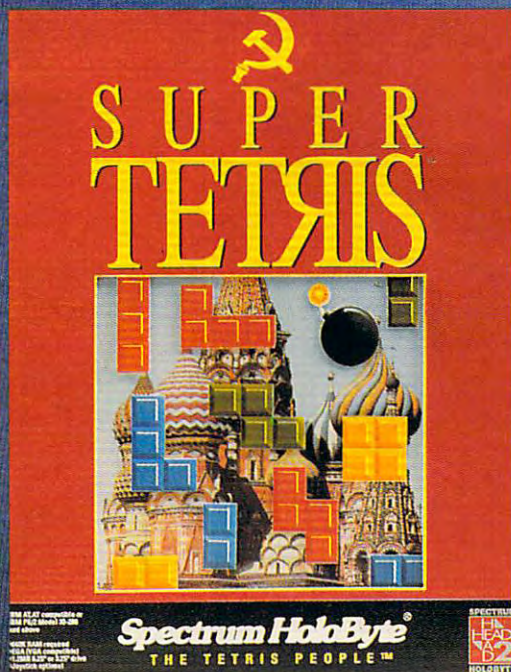
Your file can be used by either version of *Ventura Publisher*—*GEM* or *Windows*. Each time you generate a newsletter, it will contain the latest information provided by your database or inventory program.

In my experiment with formatting books, I saved time in *Ventura Publisher* by making a master disk with copies of all the style sheet and chapter files and then using a different text file for each booklet. If you create a number of similar products, this is a very efficient way to handle the task.

After all was said and done, I ended up appreciating *PageMaker*'s slickness and speed, but valuing more highly *Ventura*'s open design. □

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Available Fall
1991 MS-DOS.

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What has 9 million words in 32,000 articles; 15,000 images, maps, and graphs; 60 minutes of sound, music, and speech; 45 animation sequences; 5,000 maps, charts, and diagrams; and the complete *Webster's Intermediate Dictionary*? No, I'm not talking about your local library. This is much smaller—in fact, it's all stored on a single five-inch disc that's only a fraction of an inch high. Give up?

It's *Compton's MultiMedia Encyclopedia* on CD-ROM, and it's now available in a *Windows* version as well as a *DOS* version. The *DOS* version won a 1991 *COMPUTE Choice Award* earlier this year. But as good as the *DOS* version is, the new *Windows* version is a significant upgrade. While both offer a screen resolution of 640 x 480, the *Windows* version has as many as 256 colors instead of just 16 colors (the *DOS* version has to switch to 320 x 200 in order to show its photos in 256 colors).

The *DOS* version currently supports only the IBM Speech Adapter, Covox Speech Thing, Digispeech DS 201, and Tandy Sound, in addition to the CD-ROM drive's own audio output. The *Windows* version can produce sound with any sound board (including the Sound Blaster and Sound Blaster Pro) that's compatible with *Windows*' new multimedia extensions (called *Windows with Multimedia*).

Finally, because the *Windows* version supports the multimedia extensions, you can

now have an article, a high-resolution picture, an animated sequence, and music—all going at the same time. The *DOS* version contains all of these elements but has to stop and switch from one to another. The *Windows* version truly lives up to the name *MultiMedia Encyclopedia*.

The only catch with the *Windows* version is that you must have *Windows with Multimedia* and the hardware necessary to run it. This can take the form of one of the new MPC (Multimedia PC) computers or an upgrade kit (which usually includes the *Windows* multimedia extensions, a CD-ROM drive, a compatible sound board, and possibly a Super VGA video-display card). You'll then be ready for the many multimedia applications due to be released during the next 12 months. *Compton's* is just the tip of the iceberg.

With all 26 volumes of the *Compton's Encyclopedia* and more on just one CD-ROM

disc, you need more than just an online index to find your way around. Fortunately, Britannica Software (a division of Encyclopedia Britannica) has designed an extremely easy-to-use interface. Wherever you are, you can always see the same eight icons on the right side of the screen. Using them, you can quickly find the information you need.

To some degree the icons take you to categories of information, but to a larger degree they offer different views or doors to the same overlapping information. For instance, after clicking on the History icon, you can click on Stock Market Crash and bring up an article on the 1929 crash, which can lead you to related articles on the Great Depression, Franklin Delano Roosevelt, and the stock market.

Each of these articles can have pictures, sound, and animation and can lead you to other related articles. For example, "Stock Market" can lead you to the related articles "Business Cycle," "Foreign Exchange," and "Herbert Hoover."

